NEW YORK STATE
Conservationist
April-May, 1949

Belted Kingsfisher. ALCEDO ALCYON. Linn. *Male 1. 2. Female 3.*

STATE OF NEW YORK CONSERVATION DEPARTMENT

CUBS IN THE SPRING

THE WORM TURNS

Today we had another one of those letters. It was from a man who had been out fishing Opening Day and hadn't caught any fish. He said the stream was overcrowded, he doubted if there were any fish in it anyway "except those hatchery fish", and from what he'd heard nobody did much better on other streams. Next year, he said, he would wait and go to Canada. And he ended up his letter by asking, What is the Conservation Department doing anyway? Yours for more Conservation—

We filed this letter in the trash basket. We know from fairly bitter experience there's no use in trying to answer it because the man doesn't really want an answer; he wants a fight. He wouldn't listen if we told him that it wasn't the Conservation Department that overcrowded his stream; that if those hatchery fish hadn't been there perhaps there wouldn't have been any fish at all; that other people on other streams, even on the same stream, seem to have had a good time and caught some nice fish.

And then the question, What is the Conservation Department doing anyway? Has he bothered to find out? Does he know what the Department's stocking policy is, what it's based on, what limitations are imposed on it? Does he know that Opening Day happens to coincide with the Fire Season, and what the Department is doing about that? Does he know that while he fishes 20 million seedling trees are being shipped out, like clockwork, from the best nurseries in the world—our nurseries? Does he know what the men on our game farms were doing Opening Day? And the Bureau of Law Enforcement? Does he know that the Pollution Bill has passed the Legislature—not just passed, but passed unanimously—and does he know what the Department had to do with that? Does he know how PR-48-D works, or even what it is? Or the Forest Practice Act?

Maybe he doesn't know about any of these things. But if he's going to sign himself Yours for more Conservation he damn well ought to know about them, because the information's available. We've been publishing it regularly.

We welcome criticism, but not blind, bull-headed, uninformed selfish opposition. Conservation needs helpers—not knockers.

He says next year he's going to Canada. Good. But tough on Canada. As far as we're concerned he needn't wait a year.—Editor

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Conservationist

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STATE OF NEW YORK
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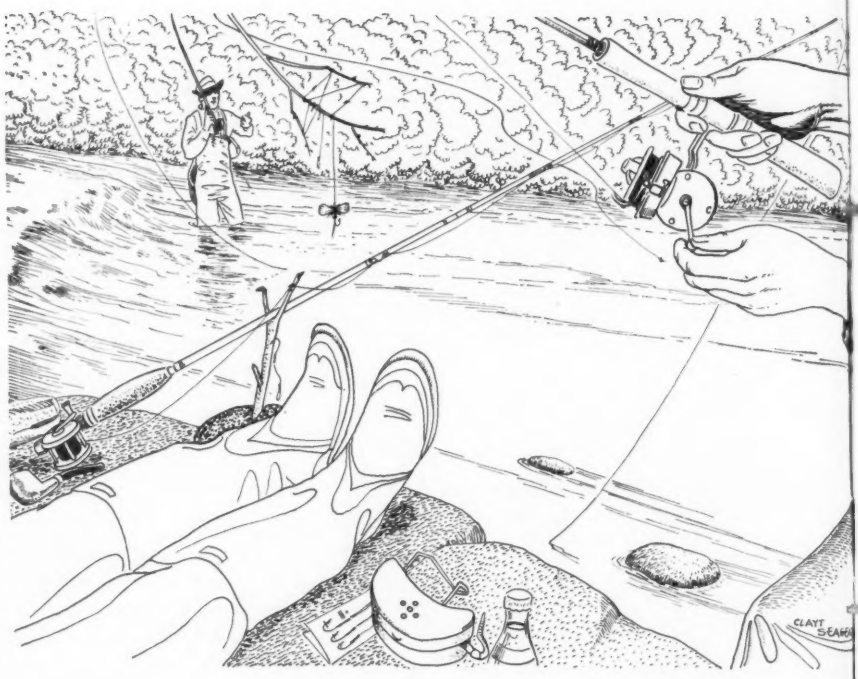
ZONE the trout FISHERMAN?

Should certain stretches – of certain waters – be restricted *to fly fishing only?*

By Arthur B. Flick



SHOULD some trout streams in New York State be restricted to fly fishing only? Now there we have a really hot potato, and I'm sucker enough to stick my neck out and say; "Yes, absolutely".

Just to keep the record straight, I want to say first that I am not a so-called "purist", for I dunk a worm now and then when conditions make bait fishing necessary. And I hope I am not one of those narrow-minded people who can see only one side of the picture. And again for the record I have owned a spinning outfit for nine years, although I don't use it for trout fishing simply because I don't enjoy that type of fishing for trout; for my money, it's too mechanical and just doesn't afford the sport that fly fishing does.

The main point I want to make here is this: Trout fishermen must awaken to the fact that free public fishing as we have known it is soon going to be a thing of the past unless we do something to help our own cause. What with the fishing pressure all our streams are now subjected to, our fishing simply cannot hold up, and we'd better do something about it before it's too late. Just stocking more fish is certainly not the answer, for recently stocked trout are not the ones that supply the real sport in trout fishing. There is very little satisfaction in catching stocked fish fresh from the hatchery, from the standpoint of either food or sport. They simply cannot be compared to fish that have been in a stream for a decent length of time. And let's not forget that trout are primarily a sport fish.

If just stocking isn't the answer, what is? Well, how about restricted waters? As a resident of New York State, allegedly the most progressive State in the Union, it grieves me to admit we are the most backward in the East with respect to restricting certain water to fly fishing only. Every one of the nearby states has such waters. If we are leaders, why are we taking a back seat in this? That's a question I'm asked often by non-resident fishermen, and the trouble is I can't give them a sensible answer except to say that we're asleep.

There are many fly fishermen who fish just for sport, returning almost all the fish they catch. Are they not entitled to a little consideration? Over the period of a season many of them will not kill a dozen fish, even though they catch many times more than that. These people pay as much as the next fellow for their sport, yet do it very little harm. With fishing pressure increasing all the time, fish over a foot long are harder to find every year. The only way we can be sure of maintaining a few decent fish in our better

streams is to have some restrictions on at least part of them.

Unfortunately, we have a group of people who are strictly "meat fishermen" and they just plain don't give a hoot about the other fellow. All they care about is getting their limit, and more often than not their stream manners match their lust for killing trout. Do you think it right to give this group who will kill every legal fish they catch (often taking more than their legal daily limit) the same consideration as the group willing to put back most of the fish they catch? Yet if such restrictions were put into effect, the fish hogs would yell the hardest that they were being persecuted.

POSSIBLY the strongest argument in favor of restricted water is that trout are the only game fish we have in New York that furnish dependable sport with a fly. If we had Atlantic salmon it would be different, but none of our other game fish—bass (large and smallmouth), pickerel, great northern pike, walleyed pike, muskalonge or lake trout—can be relied on to furnish good fly fishing. True, some bass are taken on flies, but by far the greater numbers are taken on bait or plugs. Therefore the bait, spinner and plug fishermen have seven other species of game fish they can rely on for sport, whereas the fly fisherman has only the trout.

Is it asking too much then that a small portion of a few streams in the State be restricted to the use of artificial, unweighted flies? Personally, I don't think so. Would it work a hardship on the balance of the fishermen if 20 per cent of, say, the Beaverskill, Delaware, Esopus and a few others were set aside for fly fishing only? Inasmuch as other states have found it practical I can see no reason why we shouldn't at least do a little experimenting along those lines, particularly since fly fishing in the United States really got it's start right here in New York. As far back as 1900 Theodore Gordon, the dean of all fly fishermen in this country, recommended that some of our New York waters be set aside for fly fishing only. The idea was good then, but it's even better now.

Although heartily in favor of having some water set aside for fly fishermen only, I certainly do not feel it should be in the nature of a special privilege which would give one group of fishermen an advantage over another group. I think it would be ill-advised to set aside any stream in its entirety for this purpose, because it would work a hardship on too many people. The farmer, for example, doesn't have very much time for fishing, and he usually goes on a rainy day when he can't do any farm work. He is more often than not a bait fisherman, who goes out for a mess of "eating fish", and certainly he is as much entitled to his fun as we are to our fly fishing. And too, it would be a disadvantage to the youngsters, particularly those whose parents can't afford to get them expensive tackle. After all, most of us cut our teeth on bait fishing, although we sometimes forget that.

On the other hand, it would not adversely effect anyone if certain portions of some streams, say 20 per cent, were set aside as fly fishing areas with special restrictions. Obviously, this could only be done on certain streams, for on many, fly fishing would be out of the question due to the brush along the banks. In such restricted portions the creel limit should be cut to at least one-half the State limit, and the legal size limit raised to nine or ten inches. Thus, although the fly fisherman is given a bit of an edge, he is being penalized in both the size of the fish he can take and the number.

Such restrictions will tend to make better fishing in the stream as a whole, for trout are not anchored to any one portion and especially after the spawning season many of them would naturally reshuffle and move into the waters where all fishing is allowed. So in effect, the bait and spinner fishermen would be swapping 20 per cent of the stream with the fly fishermen, and in return getting better fishing in the other 80 per cent.

IF that's the way it would work, why not have special restrictions apply to 20 per cent of any stream and allow all fishing? Unfortunately, this would not be practical, nor would it be good conservation. Fish taken on flies can be released with very little danger of hurting them, for nine out of ten taken in this manner are just lipped and the hook can be removed very easily; the loss of fish returned to the stream when taken on flies is almost nil. On the other hand, in both bait and spinner fishing, a large number of fish are hooked so badly that releasing them means dead trout, and returning them to the stream is just wasting them.

Please bear in mind, I am not advocating that every stream in the State should have 20 per cent of it set aside for fly fishing. Many of our streams would not lend themselves to such a plan. But in the area with which I am acquainted such streams as the Beaverskill, Willowemoc, Esopus, Schoharie and possibly one or two others would be ideal. Certainly it would be worth a trial, and if it did not improve fishing generally we could readily enough admit we were wrong and forget the whole thing.

Many trout fishermen have unjustly criticised the Conservation Department for not having done something like this long ago. To the best of my knowledge, the Department has no such authority (It hasn't.—Ed.) except where it owns the fishing rights. As long as I have been following proposed conservation legislation, I have never seen a bill introduced by any individual or club that would give the Department such power. But if the majority of the sportsmen in New York want it, I'll bet dollars to doughnuts the Department will go along with it.

My suggestion would be to have introduced at the next session of the Legislature a bill that would:

1—Give the Conservation Department the power to set aside up to 20 per cent of any stream, where practical and desirable; such waters to be designated as fly fishing areas, where trout could be taken only on artificial, unweighted flies.

2—On such areas, the daily creel limit shall be one half the regular State limit.

3—The legal size limit on such waters shall be 10 inches.

4—Possession on such waters of fish under 10 inches, or possession of over five fish, shall be presumptive evidence of a violation.

I realize there will be a lot of opposition to the above proposal, but before blowing your top consider carefully whether or not you will gain more than you will lose.

It is my sincere belief that such restricted areas would provide us with an opportunity to help our own sport as well as to improve fishing generally. We all know it can stand a lot of improvement.

As promised in our preceding issue, with this article we open the discussion of a subject close to the hearts of many New York trout fishermen.

Art Flick, a member of both the Commissioner's Advisory Council and the State Conservation Council, here presents one point of view, well aware *(as are we)* that there are others. In view of the fact that some sort of legislation such as Mr. Flick suggests will probably be proposed for enactment next year, we would be glad to hear from our readers on the subject. The discussion is far from closed.

Part I

SAWDUST FOR SOILS

no more

by Earl L. Stone, Jr.
Asst. Professor of Forest Soils
N.Y.S. College of Agriculture

PICK up a garden magazine and the chances are pretty good that somewhere in it you will find favorable mention of "leaf mold". To many people "leaf mold" is almost synonymous with an ideal soil; nature writers are likely to tell us how the long accumulation of decaying leaves was responsible for the wondrous productivity of the virgin soils when they were first cleared and put under the plough.

What is this thing called leaf mold? From numerous studies we know that on each acre of well stocked forest, a ton to a ton-and-a-half of leaves fall to the ground every year. But each acre produces also two or three times this amount of woody material (branches, roots, bark and trunk), and in the virgin forest this too returns to earth. So we could write Nature's formula for this famous product about like this: *"Two or three parts woody materials to one part leaves; let rot well and mix with soil before using".*

This formula may come back to you when, driving along the back roads, you run onto an old sawmill site with the sawdust pile sticking up through the brush and berry bushes. Perhaps this chopped-up wood might make humus, just as it would if the original logs had decayed in the forest. Only now we want humus in our fields and gardens where intensive cultivation "burns out" the often inadequate supply. Increased organic matter in these soils would mean better tilth, better water penetration, better nutrient supplies—in short, better growing conditions for plants. Well, here is the sawdust to supply the necessary organic matter; why can't we use it?

The answer is, we can. In fact, quite a few people have been doing just that for years. But in spite of these examples, or perhaps because they have not been much publicized, the use of sawdust as a soil improver has been limited. There were prejudices against sawdust; some said it made the soil "sour", others suggested it contained materials toxic to plant growth. These beliefs are mostly without foundation

and are largely the result of a lack of understanding about what happens when wood decays in the ground.

First, when wood (including sawdust) is added to the soil it provides food for the fungi, bacteria, and other microscopic organisms that can decompose it. Thus fed, these micro-organisms multiply enormously, and since their bodies are high in protein they utilize large amounts of nitrogen in their feeding. When the food is low in nitrogen (as in the case of wood) this element must come from the soil, and if the soil is only moderately fertile the microbial demands often remove almost all the soluble nitrogen, leaving little or none for plant growth. When this happens, crop plants are likely to be stunted and pale in color the first year with a serious reduction in yields.

Sawdust is poor in the other necessary elements for plant growth, as well as nitrogen. For example, a sack of 5-10-5 garden fertilizer will contain at least as much nitrogen and potash as a ton of dry sawdust, and several times more phosphate. Hardwood sawdust is somewhat better than softwood but the difference is small in terms of pounds per ton. The natural leaf mold which we are trying to approximate (two or three parts woody material, one part leaves) got most of its fertility from that one part of leaves, but we seldom have leaves available in sufficient quantity.

To use sawdust, then, we must supply additional fertilizers, enough for both the microbes and the plants. The simplest procedure is to use sawdust (or shavings) for cattle bedding or poultry litter so that it can become enriched with manure. Or, a legume which will take nitrogen from the air can be grown as the first crop on sawdust-treated soil. The alternative is a generous application of commercial fertilizers, particularly nitrogen carriers such as ammonium sulfate or nitrate of soda.

As for making the soil "sour", it is true that there is often a slight increase in the acidity during the process of decomposition. This is negligible in soils already "sweet" or well limed. Moreover, when nitrate of soda is applied with the sawdust the net effect may be an actual decrease in acidity.

In view of the necessity for "seasoning" it with other ingredients, is the use of sawdust really worthwhile? What does it do? How does it act?

Recently, A. C. MacIntyre of the Soil Conservation Service has been calling attention to sawdust and other wood wastes as soil amendments. Among the many examples of their successful use he tells of the Chadbourne farm in North Bridgton, Maine. For 31 years Chadbourne has been using sawdust with nitrogen additions as a regular part of his soil management program. After harrowing in four to six inches of sawdust, he seeds a legume crop for the first year. This is plowed under and a fertilizer high in nitrates applied before using the soil for strawberry or vegetable crops. By watching leaf color, Chadbourne, like many a good farmer, can tell whether additional nitrogen is necessary.

Mulching berry crops to control weeds and retain moisture is a common practice wherever sufficient mulch material can be obtained. Several berry growers on their own initiative have used sawdust and shavings with good results. Blueberries in particular seem to benefit from such treatment. There are similar reports of sawdust mulching in orchards.

And managers of forest tree nurseries have been cautiously trying sawdust to improve soil conditions for seedling growth. At one large nursery the sawdust-treated plots were so loose and friable that the young trees were removed with most of their fine absorbing roots intact—in marked contrast to the untreated areas.

All of these examples point to successful commercial use of sawdust wherever it is available and wherever the need for additional organic matter in the soil is manifest. But it is the home gardener who stands to have the most fun from experimenting with sawdust. No matter how carefully he saves his raked leaves, lawn clippings and discarded pea pods, he never has enough humus. More soil organic matter, he knows, would keep the soil from forming a crust over his newly planted seeds; more organic matter in a clay soil would let him start hoeing a day earlier following heavy rain, or in a loose sandy soil would retain more of that rain. It follows that every sawdust stack ought to inspire cupidity on the part of the gardener or home owner. By borrowing his neighbor's trailer some Saturday afternoon he could cover the whole garden with an inch or two of sawdust.

sawdust piles

The machine which produces the brickettes as shown on the preceding page. Raw material to feed the machine is sawdust, slabs and ends.

Then comes a generous application of nitrate of soda, say a pound to every 40 square feet, and thorough mixing with soil. The results are often surprisingly good. A well-known agronomist acquired a garden site on intractable clay loam—"You stand in the mud between rows and dust blows in your face from the tops"—as he described it. Although his neighbors predicted he would ruin his soil he hauled in pine sawdust, used liberal amounts of sodium nitrate, and now has a mellow, productive soil.

As a soil specialist or agronomist views the matter, sawdust is just raw organic material. But add the necessary fertility and the grand cycle of decay will soon reduce it to humus, just as it does other organic substances, be they leaves, cornstalks, or manures.

To the forester, any use of sawdust or other wood waste as a soil amendment means that the forest is a little more valuable, and the more valuable it is, the greater interest the owner will have in keeping it productive. To the mill-owner, utilization of woodwaste means better profits, and profitable mills mean more prosperous communities. As for the conservationist (the believer in wise use of natural resources), he should find satisfaction in seeing the wastes of yesterday contributing to the production of tomorrow.

Part II
"LETTS BURNETTS"

by Agnes B. Palmer

IN MID-WINTER this year, up in the Village of Northville in Fulton County, an event took place which is proving of vast interest to the lumberman and the public alike. This was the starting of machinery at the mill of the Letts Lumber Company which converts sawdust, slabs, edgings and other wastes of the lumbermill into brickettes. These brickettes are suited to serve as a clean and handy source of fuel.

The conversion process is a complicated one involving blowing, hammering, more blowing, compression and heat. Slabs and edgings are reduced to a sawdust state and combined with the pure sawdust, which is then subjected to a blowing process that evaporates approximately 15 per cent of the moisture content. Next, a hammermill arrangement carries the sawdust through a cell-fracturing process. The material is then passed through a hot air blower which extracts another 20 per cent of the moisture content from it before delivering it to the brickette machine, where a combination of compression and heat molds the sawdust into its marketable form.

The finished brickette is round, about an inch in diameter and varies in length from three to six or seven inches. It is heavy and very dense, since the air has been forced from the wood cells, and this characteristic results in a minimum of smoke being given off in burning. Contrary to what might be expected, the brickette burns slowly and with an intense gaseous flame; practically no ash is left and the heat-giving qualities are comparable to those of coal.

Walter W. Letts, inventor of this unique machinery, is a life-long lumberman. He spent more than eight years in planning, experimenting and building his pilot plant, and it was only after the usual period of experimentation and disappointments that he evolved his process for converting the wastes of his lumber mill into a very serviceable form of fuel.

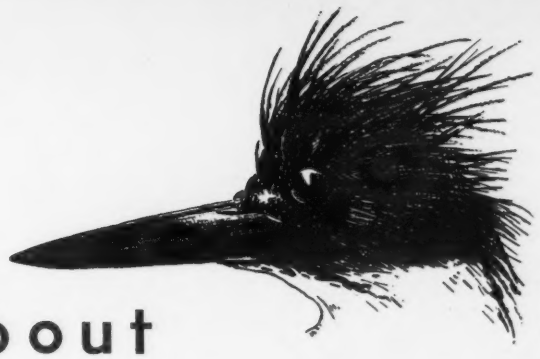
Mr. Letts' reason for starting this project was two-fold: first, the problems posed by his steadily increasing sawdust and slab piles, and probably what is more important, a sense of indignation at the constant waste and loss from what he felt should be valuable by-products. (Mr. Letts is an active conservationist, being chairman of the Forest Practice Board of Forest District #10).

When interest was evinced as to whether this new machinery might be put to service in converting the millions of tons of sawdust dotting the country's lumbering areas like giant anthills, Mr. Letts pointed out that in his experimenting he had found that sawdust up to two years old could conceivably be converted, but he doubted the possibility of reclaiming any beyond that age.

A merchandising and advertising campaign is now being formulated with a view to acquainting the public with this product. Present plans call for the brickettes being packaged and sold much the same as charcoal, and they should serve an ideal purpose for a picnic-conscious public because of their cleanliness in handling and high heat-giving qualities. The fuel will be known as "Letts Burnetts"—a registered trade name.

Mr. Letts' plans, however, go far beyond the marketing of his product. In an attempt to make the words "No More Sawdust Piles" something more than a slogan, he plans to make his machinery available to the lumber industry.

The inventor, Mr. Letts, at the delivery end where "Letts Burnetts" are finally disgorged.



About Kingfishers

The Ornithologist's Viewpoint

THE harsh, rattling call of the kingfisher is usually our first introduction to this common but rather solitary bird of our streams and ponds, for its coloring is well adapted to concealment. The female, with a red-brown band across the belly and along the sides, upsets the general rule that male birds are the more brightly plumaged, but motionless kingfishers of either sex are hard to locate. In view of Audubon's painting on our cover, no description of the bird is required other than to remark that they have weak feet; they don't do much walking.

Kingfishers are summer residents, arriving in late March or early April when the ice has gone from the water, departing in the fall when the streams and ponds start to freeze over. They nest in burrows located in sand, gravel or clay banks, generally well toward the top for safety, where four to eight white eggs are laid in the nest of regurgitated fish bones and scales.

As the name indicates, kingfishers are adept at catching fish, but four inches or smaller is the usual size taken. No one kind of fish predominates in the diet, which represents species unwary enough to be found in shallow water. Other food sources are aquatic insects, frogs and salamanders. All these are obtained by a sort of dive bombing, either from a convenient perch over the water or after a brief, hovering flight to obtain elevation, windage and drift.

Kingfishers being what they are, an unprotected fish hatchery is about as inviting as an unguarded bank to a robber, but these are both unusual concentrations of desirable goods that require some careful guarding. In natural fish waters, there is evidence to indicate that not only do kingfishers take small trout, but also some of the fish and aquatic insects that live on trout spawn and small fry. That being the case, it is difficult to say that kingfishers are good or bad, even from man's self-interested viewpoint. —RALPH H. SMITH,
Game Research Investigator

The Protectionist's Viewpoint

BECAUSE of its comic appearance and perky behavior, the kingfisher has plenty of human friends but—by reason of its dietary habits—a host of enemies as well, principally among sports fishermen and hatchery men.

The kingfisher is not protected under the laws of New York State, yet any fair examination of his feeding customs emphasizes the fact that the bird preys upon the most common and easily captured fish species in its territory. Thus, in many cases, the kingfisher is one of the best allies of fishermen, by helping them to keep down the population of suckers, sculpin, stickleback and other slow-moving, non-game fish which devour game-fish fry and spawn, and compete with game-fish for food.

On the other hand, in areas where game fish are their only obtainable prey, kingfishers certainly take their toll of them. But as these birds only take fish of fingerling or small size, they do not steal the fisherman's game. Moreover, kingfishers are not likely to remain in any neighborhood unless there is a fair abundance of fish. Where streams or ponds are overpopulated, the birds reduce the fish congestion and allow more fish to grow to larger size more rapidly.

The one really serious indictment against kingfishers is not in their operations in the natural fishing waters, but their effect on hatchery management and output. Fish-eating birds—herons, ospreys, bitterns and kingfishers—are quick to discover and slow to foresake a fish hatchery, which offers them limitless fare on a silver platter.

The practical answer is certainly not to exterminate the birds. The real solution is the simple, inexpensive procedure of overhead screening of open hatchery waters with ordinary chicken-wire netting. This screen automatically blocks the inroads of fish-eating birds and forces them to operate elsewhere, usually in areas where they are beneficial rather than a nuisance from the human point of view.—GEORGE W. DOCK, JR.,
National Audubon Society

The Hatchery Man's Viewpoint

IN the spring of the year on his return to the North, the wise kingfisher seems to select a residence adjacent to a fish hatchery. At this particular time the small trout are not of sufficient size to attract the kingfisher to any great extent, but when the young have appeared in the nest and a large volume of food is necessary, the parent birds make a great demand on the fish in the ponds. They have no respect for species but take whatever is available—trout, goldfish or bass.

The problem of controlling kingfishers in a fish hatchery is extremely difficult. A number of years ago the pole trap was used extensively to prevent the loss of fish, but was abandoned mainly because many bird lovers considered it a cruel method of kingfisher control. At the present time, hatchery men rely mostly on the shotgun, especially during June and in the fall.

It has been advocated that the hatchery ponds be screened in such manner as to make them inaccessible to all birds. This means of controlling the depredation of fish-eating birds is an excellent one, but the expense involved is prohibitive. The screens themselves are costly and in addition, when ponds are screened labor costs mount due to difficulties in maintenance, access and feeding—difficulties little understood by the general public. And labor costs are now the major item in fish production.

The hatchery man's point of view may be stated simply: It is our job to produce fish; kingfishers have been known to cut down hatchery production as much as 25 per cent; it is therefore necessary to control kingfishers to an extent where their numbers will not result in a large loss of fish. Such control has little effect on kingfisher populations except in the immediate vicinity of the hatcheries, and it in no way conflicts with the Department's often stated thesis that no bird or animal is inherently "bad" and should be exterminated. —O. R. KINGSBURY,
Supervisor of Fish Distribution

FLASH FLOOD

SPRING is the time for high water and floods. But not the only time. As the year 1948 drew to a close about 50 hours of almost continuous rain, borne on a warm front that came in from the west, deluged the east central region of New York and particularly the upper sections of Rensselaer County along the Massachusetts line. A flash flood of serious proportions developed at once. Hardest hit, in terms of both rainfall and property damage per capita, was the Little Hoosick Valley extending from Cherry Plain through Berlin and Petersburg to North Petersburg.

The purpose of this article is not to tell the story of that flood, but to recount what happened afterward. First, however, the circumstances contributing to this flood were as follows: (1) From December 29 to January 1, 8.86 inches of rainfall were recorded at Cherry Plain, which is slightly less than one-fourth of the normal average for the State for a whole year. (2) Frost at the time was about six inches into the ground, enough to prevent the rain from penetrating the soil. (3) As an average for all the Little Hoosick watershed, there were about 12 inches of snow on the ground. This melted and contributed another inch of water.

Other factors, having to do with topography rather than weather, also contributed heavily. (1) The valley of the Little Hoosick is relatively narrow, with steeply sloping mountains on either side. Thus the run-off of rain, especially when the ground has become saturated, is rapid. (2) The Little Hoosick itself has an extremely steep gradient; between the spring at its source and the point where the brook passes through Petersburg—a distance of only 11 miles —there is a difference in elevation of approximately 2,000 feet. (The photograph above was taken three miles below the spring source). Thus water moves rapidly, not only off the land into the stream, but also in the stream itself.

It will be noted that none of the

factors listed in the foregoing paragraphs can be much influenced by the hand of man. Man can't control weather, and except at great expense for small reward he can't appreciably alter topography. Is there, then, any hope of preventing floods in the Little Hoosick Valley?

THE answer is "No". With a combination of circumstances such as arrived at the year's end, there'll be another flood. Residents of the valley know this. But what they don't know, and what they're trying to find out, is what they can do to control floods so that when the next one comes along they won't be hit so hard. They have excellent reasons for doing this: since 1927 they've had five flash floods on the Little Hoosick, and according to the Army Engineers the total damage in the towns of Berlin and Petersburg adds up to $394,600. This is a big bill for two small towns to pay.

When the Little Hoosick began to subside on New Year's Day it was found that between Cherry Plain and Petersburg the situation was so serious that a delegation was organized in the Town of Berlin to seek immediate assistance in Albany. The delegation was received first by Horace S. Evans, Executive Director of the New York State Flood Control Commission, and then by Governor Dewey. As a result, a Federal allocation of $18,000 was made immediately available, and State and county equipment was dispatched to clear the river channel and repair the worst of the damage.

But it was recognized that this help, although desperately needed, was only a temporary expedient, and at the instigation of the Berlin Men's Club and the Rensselaer County Farm Bureau an open meeting was held in the auditorium of the Berlin High School on the night of March 3. The purpose of the meeting was to explore the possibilities of a permanent, long-range flood control program for the Little Hoosick, the Hoosick and the Kinderhook streams. Many representatives from all three watersheds were present.

As a background for discussion, the meeting opened with a set of lantern slides taken during and immediately after the flood, showing some of the damage done and illustrating some of the topographical features and land use practices which contributed to it. With the setting thus established, Mr. Evans of the Flood Control Commission was the first speaker.

Mr. Evans, who was accompanied to the meeting by Assemblyman E. Herman Magnuson, Vice Chairman of the Commission, explained that although there are 46 flood control projects now being developed throughout the State, no such project had yet been authorized for the Little Hoosick watershed. He stated, however, that it was "the intention of the Flood Control Commission to sponsor Congressional authority for a complete and exhaustive Federal review of the Little Hoosick watershed with a view to determining whether flood protective measures—in view of the December floods here—can be justified. In this direction, I have been assured of the assistance of your Congressman, Representative Dean Taylor of Troy."

As Mr. Evans pointed out, however, flood control in any watershed such as the Little Hoosick is mainly a matter of proper land use, and the next speaker, Hugh Wilson, Extension Soil Conservationist, underscored this point. "To be effective," he said, "flood control must start at the crest of the watershed—where the water starts—and extend to the mouth of the stream. Floods can be controlled only by community action, since running water has no respect for individual property boundaries."

MR. WILSON recommended a program in two parts. First, the channel of the Little Hoosick must be cleared of fallen trees, debris and gravel bars, so that a recurrence of high water would not flood the adjacent land. "But," he continued, "emergency measures in the stream must be the beginning rather than the end of organized community effort. The bigger job lies ahead in the development of a long term river basin project *designed to reduce the rapid runoff of water from hillsides*. Such a program is essentially a land use program designed to put every acre of land to the use for which it is adapted. Such a program will increase the water-holding capacity of the soil and distribute the flow of runoff water. Reforestation, woodland improvement, pasture improvement, establishment of long-term meadows, strip cropping and diversion ditches will all play a part.

"A community land use program will have many values other than those accruing from flood control. It will result in more efficient farming, better financial returns to farmers, and a better and more prosperous community. Development of a real community spirit is the only bright spot in the flood picture. A community working together can accomplish miracles."

The rest of the meeting was devoted to a consideration of how such a program could be organized and put into effect. Harold Klingaman, head of the Conservation Department's Bureau of Soil Conservation, outlined the advantages to be obtained by organizing a Soil Conservation District in Rensselaer County. (Although 36 counties in the State are so organized, Rensselaer is not). The board of directors of such a district would draw up a long range conservation program, as well as an actual work plan, in the execution of which the district could call on any Federal, State or local agency for assistance. Through the district, programs sponsored by the Conservation Department, including the Forest Practice Act and PR-48-D (described in our last issue) could be brought to bear.

Mr. Klingaman was followed by John Swan, Rensselaer County Agricultural Agent. Mr. Swan recommended the appointment of a citizen's committee to study the needs of each of the watersheds represented at the meeting and to draw up a co-ordinated work program. Such a committee was immediately appointed, and the meeting adjourned.

This committee has since met twice and reorganized. Each watershed in the county now has its own committee with a representative from each town in the watershed; the Little Hoosick, for example, is considered as a separate problem by two men from the two towns in its basin—Berlin and Petersburg. Such decentralization will permit each watershed to go ahead with a local program of action regardless of what the others do, but to co-ordinate the activities of all there is a central steering committee assisted in its deliberations by Mr. Swan and a representative of this Department.

At the present writing each of the local committees is preparing a written report. These reports, based on interviews with landowners and town officials, will outline the problems of the community and the degree of local cooperation which may be expected in solving them. With these reports in hand the steering committee, enlisting the aid of all the Federal, State and local agencies available, will attempt to develop a program of actual work for each watershed.

THAT'S how things stand now. Are we any nearer to a flood control program on the Little Hoosick?

At worst, the whole project could wither and die out from lack of sustained interest and local initiative. At best (and this would be something new) a conservation program could be developed for a whole valley—a program aimed not only at flood control but also at improved land use, better forestry, better conditions for fish and game. Speaking for ourselves at least, this Department would go all out in support of such a program. —P. W. FOSBURGH

Chains and Links

Surveying the Boundaries of State Forest Preserve Lands

THE Conservation Department, under the Constitution and the Conservation Law, has jurisdiction over more than three million acres of land owned by the people of the State of New York. This area is made up of thousands of lots or parcels of land.

The Forest Preserve with its two-and-a-half million acres is bounded by some nine thousand miles of line where State and private land meet, and there are in addition many hundreds of miles of interior lines separating the different subdivisions. That's a lot of boundary, and when to that are added the boundaries of the State Forests outside the Adirondack and Catskill Parks, and all the other State-owned lands, you can see that a *whole lot* of boundary lines exist which have to be correctly determined, re-established, monumented and maintained.

That's where we come in—the surveyors employed by the Conservation Department. We have to be more than just civil engineers or ordinary land surveyors because in the woods special qualifications, acquired through long and arduous experience, are necessary for the difficult task of restoring lost or obliterated lines and establishing those intersection points known to the surveyors as "corners".

In the beginning, except for streams, lake shores, and other natural boundaries, all of the property boundaries consisted of lines of marked trees through the forests. As the land was cleared and turned into farms, villages and cities, and a highway system developed, these marked boundaries were succeeded by fences, stone walls and roads. For the most part, this latter sort of boundary line prevails on the abandoned farms acquired under the Enlarged Reforestation Program. Not so, however, in the Forest Preserve. Here the boundaries are still and always will be lines of blazed trees between more or less permanently monumented corners.

Most of these lines were laid down upon the ground 150 to 175 years ago, when the original surveys were made. Boundary lines were run on every conceivable point of the compass by an assortment of surveyors, some good, some not so good, using crude staff compasses and old-fashioned link chains. They had no such mathematical control over their lines as we have today with our modern transits and steel tapes, and for the most part they just drifted along on a compass-bearing, paying attention to "local attraction" or other deviations of their compass needle only when aware of a strong deflection. The chaining was mostly what we call "surface measure" and seldom was any correction applied to convert this to horizontal distance. Sometimes these surveying parties covered five or six miles a day and would "lodge" wherever night overtook them, carrying along, of course, their rum and provisions and keeping rendezvous as often as possible with a man packing in supplies. However, most of the surveys were surprisingly well done under the circumstances, and the courts have consistently held that these original surveys, in spite of inexactness and discernible errors, control the location of the property.

But as time went on, corners disappeared and lines became lost or were obliterated by fire or clearing, and disputes arose, making re-surveys necessary. Most of you, I am sure, have heard of VerPlank Colvin and the valuable work done under his direction as Superintendent of the New York State Land Survey, in restoring many of the important land lines in the Adirondacks.

About 1911, our Department began to employ and train foresters to do its own surveying work. Much valuable re-survey work of this sort was done by J. Y. McClintock, especially in the Catskill region, by D. C. Wood and local surveyors Dan Lynch, Jim Green, W. D. Woodworth, "Jake" Francisco, D. M. Arnold, "Lem" Merrill, Wilber Smith, Capt. Watts, Howland and many others.

Although many hundreds of miles of boundary line still remain to be correctly defined and re-established, outstanding progress has been made in this work since 1911. We try to work within reasonable limits of error. A high degree of precision such as is required for very valuable city property is uncalled for in the woods, and moreover, precision does not imply correctness. After all, the primary objective sought is to restore correctly these boundary lines upon the ground, set permanent monuments and mark the lines plainly so that they can be easily found and may be identified and perpetuated by those who come after us.

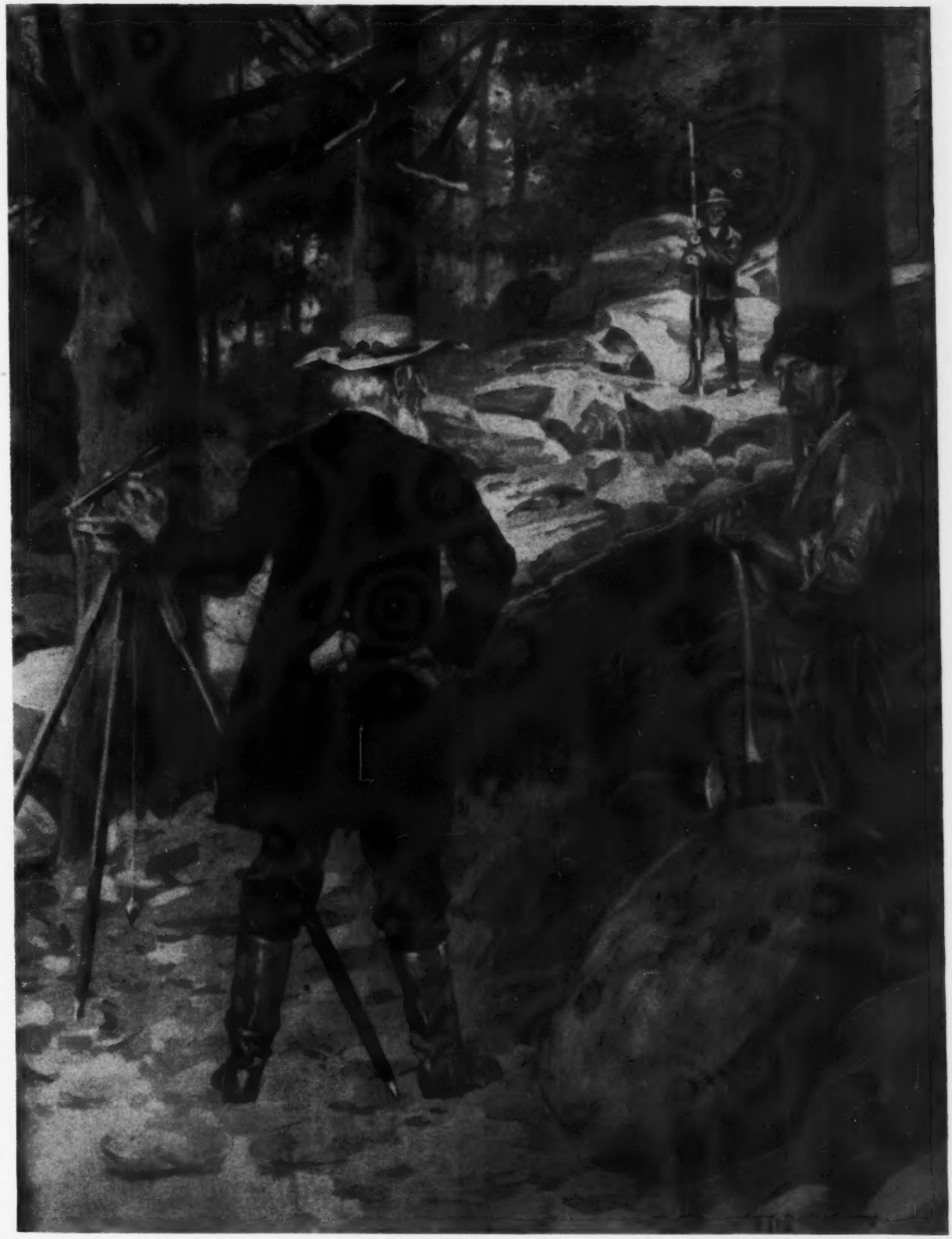
In our Albany office we have accumulated a valuable collection of records consisting of copies of original maps and field notes, many of them certified copies, obtained from the various State departments, county offices and private sources. We have most, if not all, of Colvin's field books, transit and level notes, triangulation, station data and maps, also many maps made by the local surveyors previously referred to. Consequently, we have been able to go into the field primed with the information necessary to enable us to perform an intelligent re-survey job.

WE have had several classes to deal with: (a) Acquisition surveys for the purpose of furnishing maps and descriptions showing acreage, occupancy (if any), roads, cleared acreage, etc. (b) Administrative surveys in connection with trespass, occupancy, forest fires, roads, campsites, fire observation stations, and telephone lines. (c) County and town line surveys. These have presented difficult problems. County lines require the co-operation and approval of the State Engineer, who alone is authorized by law to survey them. Many of our county and town lines are in a confused state, which often leads to serious defects in tax titles. (d) Co-operative or joint surveys made by the Department surveyors, in which the State and adjoining private owners share the expense.

We surveyors have definite responsibilities. Suffice it to say we can get into a lot of hot water if we are careless or exercise poor judgment in the conduct of our work. We may not always be able, because of lack of evidence, to prove our surveys are absolutely correct, but we should at least inspire sufficient confidence in our work so that it will be difficult for another surveyor to come along and prove we are wrong.

This surveying business is difficult work, and there is so much to contend with!—bad roads, poor accommodations, high mountains, beaver flows, dense foliage, long walks, rain and snow. But I never cease to get a "kick" out of boxing-out a survey blaze made, say by Lawrence Vrooman in 1795. I feel as though I had shaken the hand of the old fellow and exchanged congratulations with him.

—A. H. KING, *Forest Surveyor*



From report of Forest, Fish and Game Commission, 1905

FOREST SURVEYING — RE-ESTABLISHING AN OLD LOT LINE IN THE ADIRONDACKS

NEW POLLUTION LAW TOPS YEAR'S EFFORTS

BY ALL odds and by any measure, the passage of the pollution bill without a single dissenting vote in either House was not only the conservation highlight of the session just ended but probably the most far-reaching piece of conservation legislation to be enacted in many years.

It is impossible to describe adequately and at the same time briefly the exhaustive studies which preceded the formulation of this new law and the vast amount of work which went into its drafting once a fundamental approach to our pollution problem had been agreed upon. But some idea of what was required is afforded by the two articles on pollution (Oct.-Nov. '47 and Feb.-Mar. '49) written by Assemblyman Harold C. Ostertag, chairman of the Joint Legislative Committee on Interstate co-operation which did the job. To Mr. Ostertag and his committee go the thanks of every conservationist.

The pollution abatement program could never have become a reality, however, without the enthusiastic and widespread *public support* which it has had. Thousands of men and women in all walks of life, scattered all over the State, worked for this common cause.

One of the reasons the bill had such smooth sailing in the Legislature was that the committee included representatives of all the groups affected by the pollution problem—conservationists, industry and the municipalities—and out of their protracted deliberations a program was hammered out which all could agree upon as fair and workable.

It isn't our policy to make what might be interpreted as "political bows" in this magazine. We try, however, to give credit where credit is due, and in view of the far-reaching importance of the new pollution law it seems right that our readers should know who was responsible for its passage. Behind the work of the committee was the staunch support and encouragement of Governor Dewey, without which success would have been impossible. His initial message to the Legislature urging favorable consideration of the measure, followed by a special message at the time of the bill's introduction, provided an incisive analysis of the problem and compelling reasons for early action on it.

And as usual there were a number of men and women who gave yeoman service behind the scenes. On the committee itself, Morris Cohn, the committee's consultant, was indefatigable and brought to the committee a fine technical background and much experience in this field. Also with the committee, and responsible for the educational work which went with this bill, was Mrs. Isabelle Savell. In the Health Department, Commissioner Herman E. Hilleboe was backed up by Earl Devendorf, Director of the Bureau of Environmental Sanitation, who has spent most of his working lifetime in this field, and Mr. Earl W. Murray, assistant attorney-general assigned to the Health Department. William D. Bresinhan, of the Department of Law, assisted in many conferences. In the Conservation Department, Commissioner Duryea's workhorse on this project was Dr. William C. Senning, Assistant Director of Fish and Game, who over the years has become an expert in pollution problems in relation to fisheries. Ronald Peterson, senior industrial consultant of the Department of Commerce, lent valuable advice on industrial aspects.

A host of others in these and other State departments and conservation organizations made real contributions. Last but not least was special counsel Armand Adams of Ithaca, who was the principal bill drafter.

Under the new law the following steps will have to be taken before it becomes fully operative and effective:

1. The new Pollution Control Board (consisting of the Commissioners of Health, Conservation, Commerce, Agriculture and Markets, and the Department of Public Works) must be organized.
2. A staff of technicians must be recruited and trained to undertake the vast program of water classification. Adequate financial provision for this was made in the law, which carries an appropriation of $80,000.
3. The Board must formulate and adopt a set of standards for water purity.
4. Seventy thousand miles of streams and three million acres of lakes and ponds must be classified for their highest practical use.
5. The Board must formulate and adopt rules and regulations governing procedure under the new law.
6. The Board will undoubtedly undertake to encourage additional research into pollution problems, especially in the industrial field, where some treatment problems are still unsolved, while others are developing or recurring each year.

The new law is not an overnight cure. There is none. The important thing is that at long last we have the legal machinery and the directive from the people which will make possible a long-range comprehensive program of pollution control and abatement. It seems no exaggeration to say that every member of every future generation—here in New York, at least—will be a beneficiary of this progressive step taken by the 1949 Legislature. From that, as well as from the benefits which will accrue to us in our day, everyone who helped to make this step possible can take immediate and lasting satisfaction.

—J. VICTOR SKIFF

The new Pollution Control Board: left to right; standing, Commissioners Du Mond, of Agriculture and Markets, and Keller of Commerce; seated, Superintendent Tallamy of Public Works, Commissioners Hilleboe of Health and Duryea of Conservation, and Assemblyman Ostertag

Hello Sucker

THAT'S how Texas Guinan greeted them as they came flocking into her joint. Phineas T. Barnum, delving into the origin of the species, announced that there was One Born Every Minute and that it was sound policy to Never Give One An Even Break.

So much for the walking sucker. The sucker that swims is also an easy mark, but he comes into the world a lot faster than one a minute. Without a dollar spent on his propagation, without any season or size limits for his protection and without much planning for his future, the sucker remains the most abundant fish of his size class. Being a native freshwater fish whose evolutionary roots go back too far for even P. T. Barnum to untangle, the sucker seems perfectly adapted to life in our lakes and streams. Give him a small brook and he will be content to remain a "brook sucker", little bigger than a horned dace; give him a big lake and he may become a five-pounder.

Ichthyologists tell us that the suckers comprise a family known as *Catostomidae*. This Latinized name is derived from Greek roots meaning that the mouth is situated low, and the various species of suckers do in fact have a mouth far better adapted to feeding from the bottom than for taking prey at the surface. The color plates on our back cover show two of the most familiar New York representatives of the clan. Best known is *Catostomus commersonnii*, whose preferred name—common sucker—is singularly fitting in that the fish is both very abundant and plenty homely. So far as we know nobody ever called it a noble fish, even though it fights better than its down-at-the-mouth appearance would indicate. Futhermore, in his spring run up the brooks he makes his way against fast, cold water before many game fish of far better reputation have even been aroused from their winter lethargy.

As an eating proposition, it's true that suckers have a large number of fine bones. But if the fish are split so as to remove the backbone, and if the resulting fillets are fried to a nice brown, the chances are you won't worry about the bones. And when salted down in a stone crock, a good catch made when the water is cold can provide sturdy food for a long time.

Suckers usually spawn in a gravel riffle where the eggs can fall among the shelter of stones, but they also breed in lakes. They are not polygamous but are instead the direct opposite—polyandrous; the big females are pursued by several males usually somewhat smaller, and mating occurs in trios with a male pressing against each side of a female to fertilize the eggs as they drop among the stones. Sucker fry resemble transparent pins both in size and shape, and are easily seen as they swim well above the bottom, where the microscopic organisms known as plankton nourish them. Later they become more recognizable.

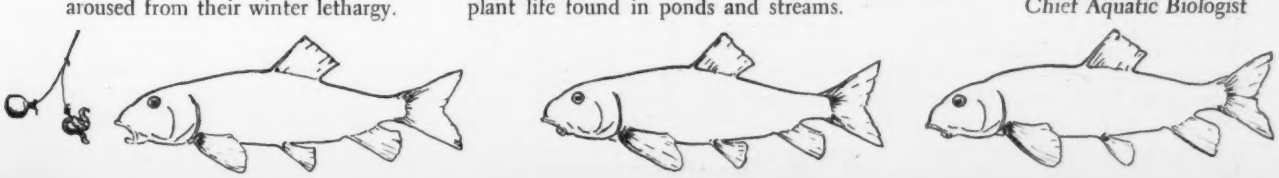
The mortality factors operating to keep down sucker populations are many, and it is known that various fish-eaters that swim, fly, crawl or walk take their share of eggs, fry or larger stages. Through his all too successful efforts to remove game fish and others of these controls, man has no doubt increased his own share of suckers without attempting to harvest the extra dividend. Instead, fish conservationists and sportsmen might do well to absorb some of P. T. Barnum's philosophy about never giving suckers an even break, for many game fish waters have their productive capacity overtaxed by the less desirable *Catostomidae*. Suckers have not been proven to destroy game fish spawn as commonly as many persons believe, but they *do* tend to overpopulate waters, drawing omnivorously upon food supplies in order to fill their long digestive tracts with a wide variety of animal and plant life found in ponds and streams.

Other fish are not molested, and are in fact welcome to dine among suckers (if they can find anything left). The heavy pharyngeal teeth of these bottom feeders, located behind the gills, form a mill which can crack the shell of snails or chew green algae into a shapeless mass. Without a lens, the student of foods thus masticated is likely to classify everything as mere mud, but patient study with a microscope will bring to light fragments of all sorts of organisms formerly living on the floor of pond or stream.

THERE are a number of very coarse scaled suckers known as red-horse or freshwater mullet. The species illustrated on the back cover is a very common lake and river fish along the Great Lakes and Lake Champlain. For a short time, this so-called mullet is available in creeks, and spearing for it and its relatives is permitted in a number of streams designated by the Conservation Department. Use of bare hooks to snatch suckers and mullets is also legitimate, small members of the tribe may be used for bait—so in general, no holds are barred. But it is advisable to consult regulations carefully to determine where and when to use such gear as minnow seine, spear or snatch hooks so as to avoid conflict with the Conservation Law; you might get into trouble if such apparatus were to be used on a trout stream.

Why not go out and catch yourself a common sucker? In early spring—right about now, in fact—he bites very well on hooks baited with worms. No fancy casting style is required, for the bait should be weighted well so as to keep it on the bottom, and there will be no smashing strikes, for the quarry will bite very, very gently. As opposed to his human counterpart, the sucker that swims is in no hurry whatever to get hooked.

—JOHN R. GREELEY,
Chief Aquatic Biologist



MORE FACTS

MORE FISH

Wiscoy-East Koy Studies Point the Way to Better Trout Stream Management and Better Use of Hatchery Fish

THIS is the story of 100,000 trout —100,000 hatchery brown trout. This is also a story of research—research as a tool of fish management. Research, as far as fish and fishing is concerned, simply means careful investigations to get sound facts on which to base better management practices.

Approximately 18% of the operating expenses of the Division of Fish and Game are allocated for fish production —mostly trout. Last year nearly 7,000,000 of them were raised and stocked. It is obviously important that the best use possible be made of all these trout, and an excellent start along these lines was made by the Conservation Department's Biological Surveys (1926-1939). These Surveys set up stocking recommendations for the principal waters in the State, recommendations based on a water's suitability for species and its carrying capacity.

But these studies also revealed problems needing further investigation. What happens, for instance, to all the hatchery trout after they are stocked? How many finally reach the creel the first year after planting? The second? The third? What is the best size to plant; fry, fingerlings or older fish? Do spring plantings provide better fishing than fall plantings?

These are field problems and the answers will come from the field. The practical way to get the answers is to mark a batch of hatchery trout so they can be identified later on, plant them and follow them through subsequent fishing seasons. And that is exactly what the Conservation Department did on Wiscoy and East Koy creeks, two of western New York's most important trout streams, located principally in Wyoming County. The Wiscoy is a tributary of the Genesee River; the East Koy is the main tributary of the Wiscoy. Both streams are typical not only of other streams in the area but of many trout streams in other parts of the State.

Brown trout, fin-clipped* or tagged were planted each spring and fall during the period of the experiment. The spring-planted trout were yearlings averaging 6.8 inches in length. The average number planted annually in each stream was about 7,000. The age of the fall-planted trout was one-and-one-half years and average length was 10.0 inches. Approximately 3,000 of these fish were planted in each stream each year. In all, over 73,000 trout of these two size groups were used.

Every effort was made to put this experiment on a practical basis. For that reason, size groups were used which can be raised in fairly large quantities. The experiment was keyed to tie in as much as possible with hatchery practice as it actually operates. To follow up the plantings, a creel census was conducted by a staff of Game Protectors. The creel census started with the season of 1942 and continued in 1943 and 1944, and this is how it worked:

It was one of those perfect fishing days in early May. And Joe Walton of Buffalo enjoyed every minute of it. His creel had a nice heft to it and he was calling it quits when a Game Protector appeared from nowhere—as Game Protectors have a habit of doing.

"Any luck?" he asked.

Joe grinned. "Want to check 'em? Got 'em all on the Wiscoy". He laid them out on the bank.

"Yes, sir, 10 real nice trout," said the Protector, and he started making notes. "These 4 were stocked last fall. See, the right ventral and adipose fins are missing. This 12-incher was planted a year ago this spring; the right ventral fin is clipped. This one has its full complement of fins; probably a wild fish. Here's 3 that were planted this spring; the right pectoral is clipped. They're just beginning to show up although they were planted two weeks before the season. This brookie is a dividend. We don't stock 'em".

Note that of Joe's 10 fish, 8 were of hatchery origin. This is in line with the figures as they shape up. For example, of the 3,868 brown trout checked on these streams, 3,425 or 89% could definitely be identified as trout of hatchery origin. Attention is called to the small number of wild fish in the catches. In 1944, on the Wiscoy, after 3 years of planting marked trout, only 24 of the 490 brown trout checked, slightly less than 5%, were unmarked and presumably wild fish. Similar figures apply to the East Koy.

This situation also applies to other streams where natural reproduction is limited. It should be noted, however, that where natural spawning is suffi-

* Control groups of these fin-clipped trout were held at the Randolph Hatchery to check on possible fin regeneration which might prevent accurate identification later. Results indicated that fin-clipping is a satisfactory method of marking trout of the size employed in the experiment.

cient to bring the trout population up to the stream's carrying capacity, heavy stocking of hatchery fish is often a waste of money. In other words, Nature may be capable of taking care of a situation if permitted to do so. In many situations of this kind, stocking is actually harmful because it adversely affects natural biological conditions.

NOTICE that 4 of the fish Joe caught were stocked the previous fall and 3 were planted that same spring just before Opening Day. During the early part of the season, fall plantings contribute more to the catches than spring plantings. The record proves this. In 1942, on the Wiscoy, from Opening Day to the end of May, 198 fish from the previous fall's planting were checked compared to 86 for the spring planting made just prior to the fishing season. In 1943 during the same period, 235 fall-planted fish were caught to 73 spring fish; in 1944, 194 fall-planted to 78 spring-planted. On the East Koy, the results were similar: in 1942, 168 fall-planted fish were recorded compared to 73 spring fish; in 1943, 104 fall to 61 for spring; in 1944, 165 fall to 104 spring.

If Joe had been checked in midseason, the situation would have been just the reverse. The bulk of his catch would be composed of spring-planted fish. For example in 1942, on the Wiscoy, from June 1 to August 31, anglers caught 135 fish of the spring planting compared to 65 of the previous fall's planting. In 1943, during the same time, 345 spring fish were checked compared to 41 of the previous fall's planting. In 1944, the score was 96 for spring against 43 for fall. East Koy figures are almost identical.

So both fall and spring plantings put plenty of fish in anglers' creels but at different times of the fishing season. However, it should be pointed out that fall plantings contributed about as many fish to the total catches as the spring plantings despite the fact that less than half as many fish were planted in the fall.

But, the problem does not seem to be a question of fall versus spring stocking; instead it is fall *and* spring stocking. On New York State's most-heavily fished streams, there is evidence that *both* fall and spring plantings may be necessary to meet ever-increasing fishing pressure.

And, if Joe had caught his limit on Opening Day, the picture would have been still different. In 1942, on the Wiscoy, during the first two weeks of the season, only 6 fish were checked from the planting made just before the season. In the same year, during the same period, on the East Koy, not one fish of the most recent spring planting was recorded. Practically the same situation occurred on both streams in 1943.

Why? There is a theory that water temperature might be a controlling factor. The hatchery stock employed in the experiment is reared in water approximately 50° F., but in early April stream temperatures are from 5 to 15 degrees lower than that. An adjustment period may be required. To test this theory, the 1944 spring planting was made about May 1st, when stream temperatures had reached about 50 degrees. Result: the fish started biting right away.

Another significant fact is revealed by Joe's catch. Of the 8 hatchery fish, only 1 had been in the stream over a year. Where were the trout that had been planted 2 seasons ago?

Creel census figures show that the largest percentage of any planting, fall or spring, is harvested the first season after stocking. Indeed, if the fish are not cropped the first year, the number available to fishermen in subsequent years is negligible. Based on three years' averages, fall plantings on the Wiscoy made up 36.3% of the recorded catch the first year after the stocking; 1.6% the second year and 0.6% the third. Spring plantings based on four years' data were: 35.9% the first year after stocking; 5.6% the second; 0.9% the third; and 0.4% the fourth. East Koy figures are almost identical.

This study and studies in other states indicate the carryover of a planting into subsequent years is surprisingly small. That is an important limitation of these large, expensive-to-raise fish.

Trout are by nature short-lived animals. When they are retained in the hatchery to be raised to large size, much of their life-span is used up and stream life is shortened accordingly. Furthermore, about the time these fish would become sexually mature, they are present in such small numbers that they contribute little to the maintenance of the stream by natural reproduction—as well as little to the creel.

This naturally leads to a consideration of the stocking of fingerlings. Accordingly, the stocking program was changed in the fall of 1944, and about 15,000 fin-clipped fingerlings between 3 and 4 inches in length were planted in each stream. Several recent samplings of anglers' catches indicate that fingerlings, stream-grown to legal size, can contribute a large part of the angler's catch at less expense and over a longer period of time.

THE McCOY
on the Wiscoy and East Koy

(1) Hatchery trout made up 85% to 90% of anglers' catches.
(2) Fall-planted trout showed up better in the early season catches.
(3) Spring-planted trout showed up better in the late season catches.
(4) The most recently stocked trout were not always the first to be caught.
(5) Survival of yearling and older trout beyond first year after planting is negligible.
(6) Over 60% of the stocked trout stayed in approximately the same spot as planted.

JOE might have caught a tagged fish. In the fall of 1941 and the spring of 1942, plantings were made on the Wiscoy of approximately 1,000 tagged brown trout to get data on migration and growth. The spring plantings were yearlings; the fall plantings 1½ years old. Nearly 65% of the tagged trout, whether of fall or spring plantings, were caught in approximately the same place as planted—many in exactly the same spot! The remainder moved upstream and downstream in fairly equal proportions. Wanderlust had bitten one or two individuals. One spring-planted fish moved upstream 8 miles. One from the same planting went downstream 5 miles. The maximum distance travelled, either up or downstream, of a fall-planted trout was 4 miles.

The tagging data also revealed the excellent productivity of the Wiscoy and East Koy. Fall-planted stock added about an inch in length over the winter. Several specimens, planted in the spring just prior to the opening of the season, added 3 inches by July!

The studies have produced other valuable information. Not the least is the value of this work in developing and refining methods of study to be applied to future investigations. Also, much of the information obtained can be applied not only to the streams under consideration but to other streams of similar type throughout the State. And, sometimes, much of the cost of the study is underwritten by the savings which eventually can be effected. In New York State, fisheries research has invariably shown a satisfactory balance between achievement and cost on the conservation ledger.

—CECIL E. HEACOX,
Senior Aquatic Biologist

Spring Geese at Oak Orchard

WHEN spring comes to Oak Orchard, so do the geese. In our humble opinion there is no more thrilling sight nor any more authentic harbinger of winter's departure than the annual flight of honkers into Oak Orchard. Flocks ranging from 10 to 1,000 birds come piling, tumbling and side-slipping into the shallow waters of the swamp on their way from their wintering grounds in the Carolinas to their nesting grounds 1,000 miles to the north near Hudson Bay. You ought to see it.

This spring has been no exception. As usual the flight came in as the ice went out, and at the present writing (April 10) there are well over 15,000 geese in the swamp as well as several thousand ducks. They will probably move on to the north toward the end of April.

The great drawing card here at the Oak Orchard Game Management Area (midway between Rochester and Niagara Falls) is what is known locally as Alabama Swamp. This swamp is drained by Oak Orchard Creek but due to rock outcroppings the drainage is far from perfect so that a substantial amount of water remains in the lowlands. Most of the swamp is wooded, but a section just to the north of Oakfield is somewhat more poorly drained than the rest and in spring months is flooded by shallow water dotted with cattails. That's where the geese hang out.

Years ago this section was partly developed by a furrier who had visions of a muskrat farm. To further his project he flooded a considerable amount of the area, but it appears that this progressive land management project was somewhat ahead of its time because when the owner died maintenance was discontinued and in the late 1930's the swamp came on the market at a sacrifice price.

The Federal Fish and Wildlife Service (then the Biological Survey) and the Conservation Department investigated the swamp with a view to the State's purchasing it and maintaining it as a wildfowl refuge. The original marsh, constituting the Oak Orchard Fur Farm, was bought by the Department. As Pittman-Robertson funds became available acquisition of additional adjoining tracts continued over several years, until now ownership of all the necessary land to carry out a sound and permanent waterfowl development is in prospect.

In connection with this development it is at present planned to spend $45,000 to establish a system of permanent dikes around the flooded portions of the area so as to make it one of the most attractive spots on the continent for all species of waterfowl—particularly Canada geese. About a third of the development has already been completed; the main marsh will be ready for water by late summer.

One of the management techniques already in operation is based on the habits of our visitors; every morning at daybreak and each afternoon just before sundown the geese are in the habit of taking off on foraging expeditions to grain fields in the neighborhood. In order to keep the geese closer to home and to provide them with a handy food supply we are planting fields of rye and wheat in the immediate vicinity of the marsh.

Incidentally, this browsing, instead of damaging the prospective grain crop, often produces a greater ultimate yield than would otherwise have been the case, as wheat plants "stool out" as a result of the selective picking by the geese. In any case, wheat harvested in the summer after the geese are through with it can be—and has been— used to supplement a winter feeding program for pheasants on our game farms and elsewhere.

Eventually we expect to plant the entire upland portions of our Oak Orchard properties in rotation so that upwards of 250 acres of grain crops can be raised each year. Part will be harvested, part will be left standing as feed for migrating waterfowl. Most of this upland area will be classified as public hunting grounds. At the present time, roughly 40 acres are in winter wheat, about five acres in rye, with about 75 per cent of the winter wheat seeded down for permanent cover. This spring we are plowing an additional 40 acres for corn and another 40 acres for buckwheat.

THE migration of Canada geese this spring is larger than ever before, partly we think as a result of management measures such as those outlined above which have already been undertaken. In connection with these periodic migrations, we are attempting to live-trap a few geese so that they can be wing clipped to force them to stay on the area during the summer—in the hope that we may thus establish a permanent breeding population. The idea being of course, that geese born on the swamp will come back to nest on it.

Strictly for experimental purposes we maintain a blind on the marsh from which the migration can be observed and studied without unduly disturbing the visitors. But regardless of the caution we use in entering the blind there seems always to be a lookout.

The photograph above, taken from this blind, shows a lot of geese. But it was taken with a telephoto lens and although we got into the blind in pitch darkness and waited two hours until daylight, the nearest we ever got to a goose was a hundred yards. Geese are smart.

—ROBERT F. PERRY,
District Game Manager

skunk cabbage

AQUILL GORDON, ignoring a foul casting technique, settled leisurely to the big pool on Stony Brook. A small trout rose. And just then the mother of all black bears rounded the bend a hundred yards below, slowly making her way upstream, snuffing along the soggy bank like a pig seeking forage. As she approached the fisherman could see what she was doing: nibbling the tops from skunk cabbage. (Grunts the reader at this point, "At least they're good for something").

Despite its role as the harbinger of a perennial awakening of plant life, the skunk cabbage is as much maligned as the striped animal whose odor the flower imitates, especially when bruised. The first plant to appear in spring, *Spathyema foetida* thrives along streams and in low meadows and swamps, sticking its root-stalks up even through the snow. These thick stalks are well-suited to piping quantities of water for the fetid herb's rapid growth. And it needs water, for its leaves often grow to be a yard long and a foot wide. When the cabbage approaches September maturity, its bulbous fruit is hooded by a mottled canopy that usually sways off to one side like a drunken cobra.

Spathyema has at least one friend: the trout fisherman. For the flower's appearance is the signal for going over rod windings, sorting flies with nervous fingers, digging into the frosty ground for a worm (just in case)—and finally, checking the hip pocket for anti-freeze before stepping off into icy April waters in cool defiance of the little woman's acid admonitions.

Incidentally, *Spathy* gets around. His family has even invaded Siberia, and it takes a lot of courage to do that.

—J. D. BULGER

Who reads this magazine, anyway?

ENCLOSED please find one gag. We don't know yet whether this gag is on you or on us and we just can't wait to find out, but somebody oughta getta laugh.

We refer, of course, to the little gag inserted in this issue, whereby you are invited to help us sign up new subscribers and so collar for yourself, for free, another year of this magazine. More of that later.

Meanwhile, who reads this magazine, anyway? For one, the distinguished lady who appeared at a Department booth and fingered a CONSERVATIONIST.

"What's this all about?" she asked aggressively.

She was told. She dug into a well-stocked purse.

"I don't know why I'm taking this," she muttered. "Maybe it's a throwback to my caveman ancestors."

"Maybe you've fished or hunted or camped," we said hopefully. She snorted. "Never!"

"Your husband then?"

"My husband was shot several years ago and is no longer among the living," she answered tartly. That was that. But she now receives the magazine.

She's only one. Deep in the woods near Indian Lake, along a shaded trail, there was a small brown paper wrapper on the forest floor. It was a CONSERVATIONIST tab. The only visible inhabitants of the area were squirrels and so far as we know we don't have any among our subscribers. So the conclusion is that some individual had enough interest to carry the magazine with him. That makes us happy. It makes us as happy as the time when Leland Silvieus of Monticello, a rural mail carrier, got so curious about the magazine as he carried it along his route that he decided to get himself a subscription. He wrote us:

"Every time your magazine is found among the mail for my route I promise myself I will subscribe, each time putting it off until I find a more convenient time. Today, March 16, at 2:35 p.m., I am sending my dollar!"

Another woman, who handled her husband's correspondence, wrote in and notified the magazine that her spouse had not received a copy and that the "household would be in turmoil" if the missing copy weren't sent in. The husband got one and we hope we salvaged that marriage. A chairman of the board of directors of a steel company became one of our best salesmen and turned in 16 subscriptions. A Troy insurance man turned in at least 25; he survived the circulation fever. A 14-year-old boy gave the magazine to his dad and a 9-year-old boy subscribed with money he made selling newspapers, adding that he hoped he'd have enough cash to renew his subscription; we raised a dollar here in the office and took care of that.

Incidentally, renewals are more consistent now because of a form suggested

Champion salesman: Bruce Harshbarger of New Berlin, who sold 720 new subscriptions

by Harry Wilkes, head of our machine room. On March 11 we got 69 renewals for two years, 21 for three years, and 10 for five years. Fred A. Lindboe of 301 Church Street, Red Hook, went whole hog and renewed for 10 years.

Back on September 1, a circulation drive was begun with Game Protectors as salesman. It had the endorsement of Department heads and more important, the endorsement of the men themselves. The results showed their enthusiasm. The very first return came from Protector William Riordan of Wurtsboro. By October 21, Protectors had turned in 1,160. By October 29, the total had gone up to 2,000. On November 19, the total was 3,100 and showed no indication of stopping. It didn't, either. Deer checking stations accounted for hundreds. (It was obvious, about this time, that a Special Game Protector by the name of Bruce Harshbarger of New Berlin was spending long hours and was producing). By December 1, the total had whipped up to 4,133.

The Big Week was the one ending January 21, when 1,401 new subscriptions arrived in our office. The campaign ended February 20. By that date the Protectors, penetrating the jungles of the cities as well as the lonely log-cabin areas of the North Country, had produced the wonderful total of 7,782 new subscriptions. A newspaper would give its eye-teeth for such results from circulation crews.

It wasn't easy; the boys did their own work and their sales job simultaneously. Mr. Harshbarger, a Special since 1944, who traveled 3,000 miles and worked at least 420 hours on the campaign, was high man with the astonishing total of 720 subscriptions. Bruce went through New Berlin and nearby points like a prairie fire.

The campaign was divided into four sections. District Game Protector Clifford E. Moore of Rochester was high man in his classification with 105 sold; Assistant District Game Protector Wilfred J. Lindner, also of Rochester, won top honors in his with 325. Assistant District Game Protector Guy R. Milroy of Poughkeepsie was second with 221. Milroy is a consistent seller. He sold 110 in the 1947 fair at Rhinebeck and 150 last year.

West Chazy is a small place in the Adirondacks, yet Game Protector Ralph H. Milne did a whirlwind job and won in his class with 254. Protector Ralph Mayo of Lockport was second with 166 and Richard E. Emperor of Saranac Lake was third with 153.

Second to Mr. Harshbarger amongst the Specials was Roy J. Kane of Gasport, who turned in 336, and third was John Woessner of Flushing, who did right well by the Department with 156.

These men did a splendid, much appreciated job. On Tuesday, May 3, they will be honored at a testimonial party in Commissioner Duryea's Albany office, when each will receive a prize.

AND now the question is, who is *going to* read this magazine, anyway? That depends almost entirely on you. If you feel (as we do) that Conservation in New York would benefit from having more people read THE CONSERVATIONIST, then maybe you'll take our gag seriously (as we do, of course) and sign up a few new subscribers for us. Not necessarily ten new ones; we'll settle for one or two.

We state our proposition on the card inserted in this issue. It's a modest proposition and maybe the reward is small, but we'd certainly appreciate it if you'd take us up on it.

—BARNETT FOWLER

BONE MARROW as an index of malnutrition in deer

DURING spring surveys of winter mortality of deer in the northern and northeastern states, many carcasses are found which have been denuded through decay and scavenging. One of the objects of these surveys is to determine the extent of mortality from malnutrition caused by severe wintering conditions. Since the surveys are often conducted at a considerable interval (two or more months) following the first deaths, there is the problem of determining from skeletal remains alone whether the animals died a lingering death accompanied by emaciation, or a sudden death in which little weight loss occurred.

It has been noted in deer that the marrow core of the femur (leg bone joining the pelvis) is almost solid white fat when the animal is in top condition. When it reaches a state of starvation, this femur marrow is red or yellowish and of a gelatin-like consistency and appearance. This fact was known and was being used to advantage by C. W. Severinghaus (leader of the New York Deer Research Project) in the course of surveys on winter mortality of deer in the State. He discussed the use of this knowledge with leaders of other northeastern state deer projects. It became evident to this group that there was need for a simple field method for estimating the fat content of bone marrow from deer found dead. This need was brought to my attention and a job was set up to investigate the possibilities and, if feasible, to provide an acceptable technique.

A single bone was chosen for comparative study because of the known variability of different skeletal members in the function of their marrows as blood-forming and fat-storing centers. The femur bone was used in the present study for several reasons. It is furnished with a large marrow core, the behavior of which in relation to starvation had already been observed. It lies deeply within muscle tissue and is furnished with an abundant blood supply, facts of considerable importance to the problem since as a consequence the femur marrow should be more responsive than other bones to nutritional changes and alterations in certain blood element requirements. A further restriction of marrow sampling within the femur was required because of the progressive alteration of the marrow proceeding outward from the femur head. Because of this, the middle third of the marrow core was chosen as the standard sample for comparison.

Following a brief preliminary investigation which consisted in comparing the femur marrows of deer in several stages of physical condition—ranging from fat specimens taken in the fall to those dying from malnutrition in late winter—it became evident that a set of visual criteria for estimating fat content of marrow could be devised. In order to learn the actual fat content of the marrows, 123 samples from 104 deer were subjected to alcohol-ether extraction and the amount of fat calculated in percentages of both fresh and dry marrow weights. A correlation was found between progressive reddening of the marrow core and diminished fat content. Furthermore, fat reduction in the marrow bore a relation to its diminishment in the fat depots of the skin and body cavity, and to the degree of weight loss of the animal.

WHILE a reduced fat content was usually associated with an increased reddening of the marrow core, in some cases it was yellowish (Figure 4), a condition probably indicative of a low state of red blood cell formation. The gelatinous stage of femur marrow was never observed without general emaciation being evident.

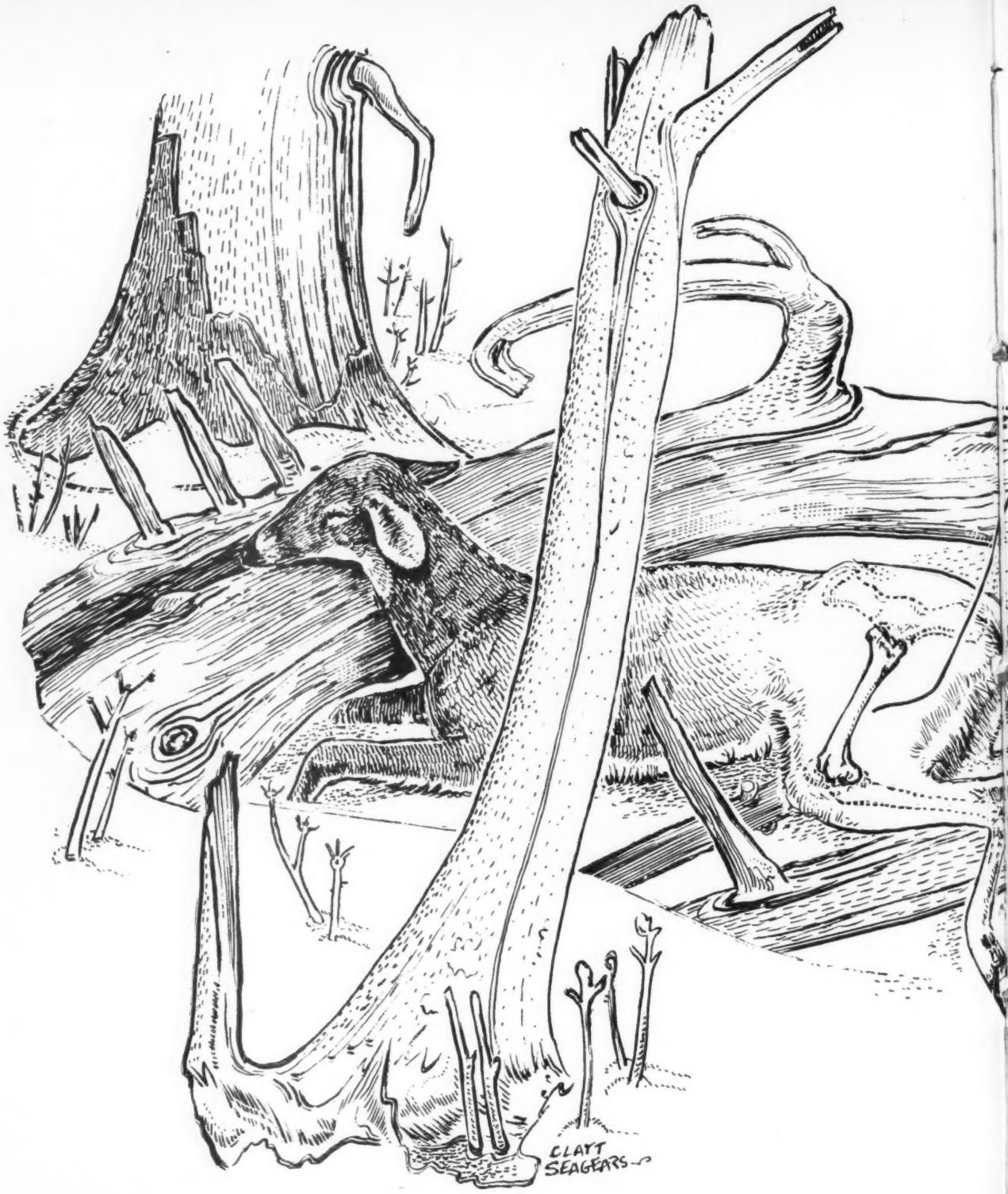
The accompanying color plate presents water-color sketches of bone marrow segments taken from the middle third of femur shafts. Figures 1 to 8 were drawn from fresh specimens, while Figures 9 to 12 were drawn from dehydrated ones, corresponding in fat content to Figures 5, 6, 7 and 8, respectively. The percentage-fat by fresh weight of these samples is given in the legend for each figure.

For the fresh specimens, Figures 1, 2, 3, 5 and 6 illustrate the progressive reddening of the marrow as its fat content declines. Figures 4, 7 and 8 are yellow type marrows which may be associated with anemia. Although they appear out of line with the color progression noted above, they nevertheless represent conditions of low fat content. The cause of this yellow marrow has not been definitely established, but in two instances (Figures 4 and 8) purrulent (pus forming) infections of grave extent were present in the deer. These infections may have interfered with normal, blood-forming functions and resulted in anemia which was manifest by the pale, yellowish appearance of the femur marrow. Cases of nutritional anemia may result similarly.

FIGURES 9 to 12 illustrate the type of specimens which may be encountered by the field man in femur bones which have weathered over an extended period. The water content has disappeared by evaporation through the porous bone shaft. Femur marrows with high fat and low water content which have weathered for at least one year displayed little alteration in bulk from the fresh state.

In using the color plate as a basis for estimating femur marrow fat content, it must, of course, be recognized that the figures on the plate only depict arbitrary stages in fat withdrawal. There are innumerable gradations between each figure, and there is also considerable variation in color, quality and pattern in any one stage. It must also be emphasized that the marrows pictured apply only to the middle third of the femur shaft, and do not apply to marrow from any other bone. As a general rule, the farther marrow bone is located from the body proper, the more fatty the marrow. Thus, bone marrow from the lower leg (canon bone) may exhibit a white, solid stage (Figure 1) whereas the femur marrow from the same leg may be dark pink (Figure 3). This fact appears to be related to a cooler temperature of the extremities and the resultant diminution of the blood-forming function of marrow

(Continued on page 22)

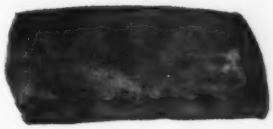


RESEARCH SOLVES DEER DEATH CAUSE

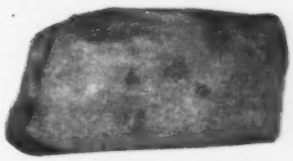
Deer which die during the winter, particularly in the Adirondacks, usually aren't found until the spring—too late to determine readily the cause of death. But knowledge of what caused death is essential to proper management of the deer herd. Analysis of the marrow of the femur bone (location of bone shown above, with marrow sections at right) provides this information.

1. White solid (90%)

2. Spotted pink solid (85%)

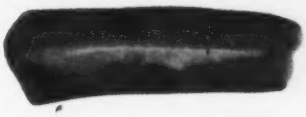


3. Dark pink solid (70%)

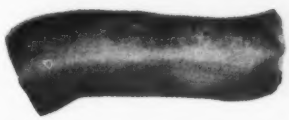


4. Yellow solid (55%)

5. Red solid (50%)



6. Red gelatinous (1.5%)



7. Yellow gelatinous (1.5%)

8. Yellow approaching gelatinous (10%)

9. No. 5, dried

10. No. 6, dried

11. No. 7, dried

12. No. 8, dried

EXPLANATION OF FIGURES

How bone marrow can indicate the condition of a deer: Appearance of marrow (natural size) in mid-femur (thigh bone) sections from white-tailed deer in various stages of fat depletion. Percentages in parenthesis ( ) represent fat content by fresh weight of marrow samples. Figures 9 to 12 represent dehydrated specimens which correspond to figures 5 to 8 respectively.

found there. It may also be that as the animal starves, there is a progressive utilization of marrow fat outward to bones of the extremities, and death may result when over 90 per cent of the fat in the femur bones has been consumed but a relatively large amount still remains in the lower leg bones.

In addition to changes in the color of femur marrow as the deer draws on its stored fat, there are changes in its consistency. The observer will readily become acquainted with the feel of marrows from deer in different stages of nutrition. The fatty marrow has the solid, waxy feel of the tallow one finds in the fatty depots of the deer's body cavity (e.g., along the back straps and around the kidneys). It approximates the condition of marrow in the femur bone of a fat leg of lamb. In the "red solid" stage (Figure 5) a slight fatty quality to the touch is still present but the consistency is more liver-like due to the greater amount of water present and the more fibrous structure. Between the red solid and gelatinous stages, the marrow resembles brain tissue in consistency and may often have a glistening, but opaque, grayish-pink appearance. In the gelatinous stage (Figures 4, 7 and 8), the marrow is translucent, glistening, wet to the touch and with no fatty quality present. If crushed between the fingers it will be found to consist mostly of water.

Adult deer attain their greatest quantity of stored fat in the fall and early winter. As a general rule, the femur marrows exhibit the white solid stage during this period. As winter progresses, and especially when deep snow hinders access to adequate food, the animals begin to burn their stored fat. It seems that extensive withdrawal (reduction of over 50 per cent) from the marrow fat of the femur does not occur until the fat depots under the skin, around the viscera, and other surfaces within the body cavity are exhausted. Although previous to this stage some femur fat is lost, the serious depletion of this fat source appears to begin coincident with the process of emaciation wherein other tissues (e.g., proteins of muscle) are drawn upon as a source of fuel. When less than 25 per cent by fresh weight of the femur marrow is composed of fat, it is evident that a serious stage of malnutrition has arrived. Deer have been collected while still able to move around on their feet and with the femur marrow reduced to 1.5 per cent fat. These animals would probably not have recuperated even had they been treated with the best of shelter and food. A few deer have been found dead in locations with poor shelter with from 20 to 25 per cent fat in their femur marrows. Differences in the degree of shelter from the chilling effects of wind and low temperatures may be important factors in determining the ability of some animals to survive long enough to deplete the marrow fat to values lower than 15 or 20 per cent.

The femur marrow of fawns is normally of the red solid variety (Figure 5) until they begin putting on their winter supply of fat when four to six months of age. If good growth has been attained before the rigors of winter arrive, their marrows will usually contain a high percentage of fat. Changes in marrow appearance with fat depletion closely resemble those observed in adult femur marrows. Casualties from the hunting season among late born fawns are likely to show red, solid marrows, normal for deer in their first three or four months of life. Their size and tooth development will reveal their age, however, and appropriate allowance can be made in interpretation of their marrow conditions in relation to possible malnutrition.

—E. L. Cheatum,
Senior Game Pathologist

HOW TO DO IT (2):

Planting Willows

OF ALL the conservation projects that you could take part in at this time of year, few if any are more rewarding, less expensive, more practical, less trouble than willow planting.* Surely there's a stream bank in your neighborhood that needs protection from erosion; almost certainly there would be more trout in the stream, and bigger ones, if there were more vegetation along the banks to provide cover, harbor insect life and keep the water cool; maybe the lowlands and sloughs near the water need a protective covering of plant life; maybe they would just *look better* with such a covering.

For any or all of these needs, willows are the answer. Because they will grow from cuttings, because they are abundant, fast growing and easy to establish, willows are your best planting bet in and around water where at least a reasonably moist subsoil is assured. You don't have to know whether you're planting a Golden Ozier, a Brittle Willow, a Shining Willow, a Black Willow or a Weeping Willow; all do a good job as soil binders and all provide excellent shade and cover.

Where do you get willows? That's no problem in New York because willows of one kind or another are native to almost every section of the State. In general, you would do best to use cuttings from the kind that is native to your particular locality—because you can be sure they will grow and because you will get fresher cuttings with less work and in shorter time. Where sand or gravel bars have formed from eroded material in our streams, sandbar willows take over with such a tenacious grasp that neither floating ice nor flood waters can dislodge them. These willow-covered islands are so numerous in our streams that they make an excellent source of supply for smaller cuttings.

What size cuttings? That depends on where you're going to do your planting, and for what purpose. If you want to plant a comparatively still section of stream or the shores of a pond, where large trees would do well, cuttings three to six inches in diameter, 10 feet long, planted 20 to 30 feet apart and at least 10 feet back from the water's edge will do nicely.

But if erosion control is the primary consideration, anything from small twigs to branches six inches through can be used. The larger cuttings should be spaced about five feet apart; smaller cuttings (whips) should be closer together, with ten or more stuck in each hole. Another method of planting the small shoots is to lay them across ditches with their ends sticking out, covering and tamping in the midsections. This makes a fine root-mat. As for large eroding banks, they can be protected by using a post maul to drive in willow stakes at close intervals.

There are two very important rules that apply to willow planting, regardless of the size of the cutting or the purpose of the planting. (1) Any cutting must be planted deep enough so that the butt end has access to plenty of moisture. Since planting is best done in the spring of the year, and since the underground water level is usually higher then than later on, it's easy to make the mistake of not planting deep enough to insure a year-round supply of water for the roots.

(2) Keep cattle out of your plantings. Cattle will leave a field of alfalfa to browse on willow shoots. If you can't fence out the cattle, use cuttings three or four inches in diameter, plant them deep, and have them long enough so that at least a third of the top section is out of grazing reach.

Obviously no elaborate or expensive tools are needed in willow planting. A crowbar will ram out the holes for the smaller shoots; a fencepost auger will do the job for the larger ones. But no matter how you make the hole, be sure that once you've got the cutting in it you tamp it down properly.

THEY say that willows have little economic value except for fuel and charcoal. From the cash crop point of view, that's true enough. But the value of willows in any program dedicated to the conservation of soil and water can't be overestimated, and the sad condition of so many of our streams and stream banks is influencing more and more New Yorkers to realize that fact.

It probably wasn't just by accident that Nature made willows brittle; when the branches break off they're apt to wash downstream and take root some place where they're really needed.

—EMERSON JAMES,
Supervisor of Fish Management

* For additional information about willows, see page 24, Feb.-March '48 *Conservationist*.

the SHAD

ACROSS this State from early April to mid-June, from broiler and stewpot, from skillet and oven, in hamlet, village and city, there arises a fetching aroma of shad enroute to the table. This great to-do with pots and pans each spring, accompanied by the widespread gastronomic occupation of picking fish bones from between the teeth, is largely occasioned by the annual spawning run in the Hudson River of that big cousin in the herring family, *Alosa sapidissima*, the shad.

In the Hudson, signalled it is thought by increasing water temperatures and light intensity, the shad normally make their appearance in late March or early April. Approximately 60 per cent of the run is made up of three-year-old fish or first year spawners, with smaller proportions in the four, five and six-year classes.

Spawning takes place while males and females (called bucks and roes) school near the surface over sandy shoals. In the Hudson, the favored spawning grounds are known as the "Flats" running from just north of Kingston Point, almost to the limits of the City of Albany. In normal years spawning occurs in late April and May at a water temperature of approximately 56° F. Hatching occurs in from three to eight days—at least for those eggs which do hatch, for studies indicate that only about eight-tenths of one per cent of the spawn ever reaches the embryo stage. This alarming casualty rate continues, on a slightly diminished scale, during the early life of the fry, tapering off as they grow older. The young shad remain in the river until the approach of cold weather, feeding upon small flies, minute crustaceans and insect larvae. The then four to five-inch young work downstream to coastal waters, there to grow lustily and await their return to the river as spawning adults.

Perhaps from the shad's point of view the weak link in his life cycle is the spawning run. From man's, however, it is a most convenient activity upon the part of the shad for such runs concentrate, as within a funnel, the whole adult population associated with a particular river, making it relatively easy to harvest this species.

From colonial days to the present we have capitalized on this fortunate circumstance in supporting a very valuable Hudson River fishery, amounting the last ten years to an annual catch of approximately one and a half million pounds. Some 300 commercial fishermen harvest this silvery fortune operating specific types of gear during the open season—March 15th to June 15th.

BUT as amazing as this shad catch during the last decade may be, it is not the whole story by far. The fishery has seen even palmier days—days when the spawning run in the Hudson far exceeded anything we have seen in the last half century or more. But hard times were at hand for the shad in the late 1800's, and strenuous efforts were being made to revive the fishery through artificial propagation and stocking. In 1893, inspired by an upswing in the run about 1890, the U. S. Fisheries Commission reported "The maintenance and increase of the supply of shad in recent years, in the face of an enormous annual catch, are, without question, attributable to artificial propagation carried on by the national and state fish commissions". Unfortunately the author of this spirited analysis was unavaliable for comment when in the Susquehanna River, where over 100 million shad fry were stocked annually between 1900 and 1910, the spawning run dwindled to the point where eggs for hatching could no longer be obtained in sufficient numbers to operate the hatchery.

In the Hudson River shad were in trouble too in the early 1900's as reflected by a commercial catch in 1915 of only 24,209 pounds. In an effort toward revival, the Conservation Department was granted regulatory powers to manage the shad fishery. Many of our present day regulations incorporating closed seasons, closure of the principal spawning grounds on the "Flats" to netting, establishment of a mandatory 36-hour "lift period" and restrictions as to the type of gear and mesh size were evolved in an effort to bring back the fishery.

It's nice to think that these management regulations account for the phenominal recovery of the fishery, especially so when we see our Atlantic seaboard neighbors effecting similar measures and studies in an effort to stem their still dwindling shad runs. But lest we become overwhelmed with complacency let us keep our fingers on the patient's pulse. There's plenty still to learn about our old friend, the Hudson River shad.

—A. W. BROMLEY,
Assist. Supt., Inland Fisheries

The very latest thing in bee trees, complete with hinged door, hasp and padlock. Any time Bill Jeffress needs some honey all he has to do is open up his tree and dip in his ladle.

BEE TREE

I DON'T like bees. But I do like honey. One hum from that aerial dental filling and I shy like a horse from a rattler. As a boy I got stung even in spelling bees. Whenever I hear someone extolling the bee's social life, I demonstrate that they kick their menfolk out to starve. People say they're clean; I counter that they can't even wash their own backs. And morals? The drones don't even have a father, only a grandfather. So much for bees. But honey? Just drip a luscious spoonful on a slice of whole wheat toast and I'll beat even a hangover to the breakfast table.

The ubiquitous creature responsible for this golden morsel comes from a large family. Fifteen hundred different insects are known as bees. Of these *Apis mellifera*, the honey bee, heads the whole insect world in intelligence.

A good share of its life since days of ancient Egypt has been carried on in some sort of hive, where the varicose little so-and-so leads a deceptively domestic existence. But frequently it escapes from these houses and returns to the woods to carry on operations from a hollow tree.

Various ways have been developed for finding these woodsy homes. The old school is represented on the right where you see a "bee box" (above) and a combination trap and cage (below). These gadgets, now at the Farmers' Museum at Cooperstown, represent an age more inclined to soap-box whittling than soap-box opera. One advantage claimed for these devices was that two persons could start out a distance apart and, by estimating where their beelines crossed, arrive at the tree by a system of triangulation.

Simpler methods of detection involve putting out near some woods a saucer of diluted honey or simple syrup. Soon a humming airlift will be transporting your treasure and you can keep moving in the direction of their flight until you arrive at the bee tree. Or at your neighbor's hive.

Once found, a bee tree is too frequently cut down, split, and ruined. A more sensible practice began (as far as we know) with Bill Jeffress (above). Bill, finding a bee tree on the farm of "Marse" Bair, tapped on the tree until he found the hollow spot, cagily cut a door into the succulent harvest, attached hinges, hasp and padlock. Now, instead of an expendable pile of poor stove wood, Bill has a renewable source of wild honey which he calmly raids whenever his supply is low.

Hunting bees is fun of a summer Saturday, Bill says, but wait 'til *late* fall to use your trapdoor. For even in early frosts you can infuriate the "bee bike" inhabitants and receive a stinging rebuke.

Bee stings are no joke. For unless you are a confirmed alcoholic, an immune old bee-tender, or both, the effect of bee venom on you is unpredictable, especially if you get stung about the face. Authentic reports by the dozen confirm death from a single bee sting.

So on your bee hunt, take a smoker (right, center) to keep the bees quiet. If you get stung in spite of that, scrape the stinger out with a fingernail, then apply a cake of wet soap, weak ammonia, or moistened baking soda.

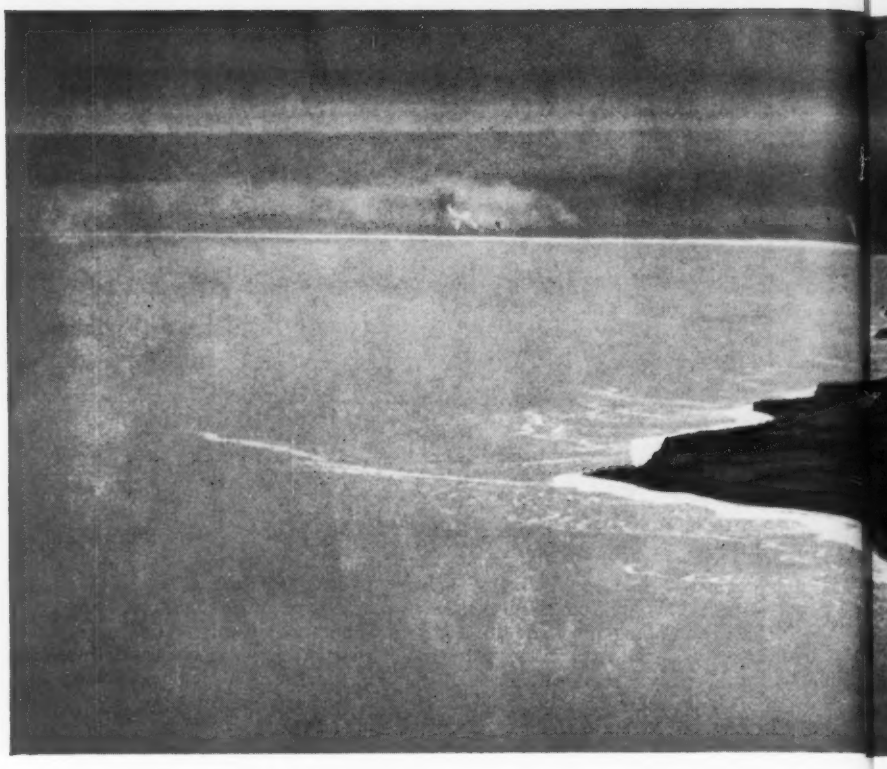
Now, armed with this good advice, shall we go a bee hunting? What, you've already found a tree? Lead the way and I'll be right behind. A light year or so behind. —J. D. BULGER

Not the latest thing, but a reliable bee box used to trap and carry bees on "tree-hunts".

A smoker. Bellows fan a smudge inside the horn and blow smoke to quiet excited bees.

Another type of bee box and trap. This one, with sliding metal floor, holds more bees.

LAKE ERIE



by William C. Sengbusch

THE first commercial vessel to sail the Great Lakes was launched on the bosom of Lake Erie. The "Griffin" was a good ship and her master, René Robert Cavelier, Sieur De LaSalle, was no novice in the navigation of these waters, having previously travelled back and forth with his Indian guide in their birch-bark canoe. But Lake Erie is temperamental. Perhaps she resented this first intrusion in the name of commerce. In any event, after proceeding to Green Bay, Wisconsin, where she received a load of furs, the "Griffin" started east and was never heard from again.

Perhaps one of Erie's violent storms swallowed her, for violent storms are not uncommon on a large lake whose maximum depth is only 210 feet. Since then, the untamed spirit of Lake Erie has been broken to the use of man and many vessels now traverse her waters for pleasure and profit in comparative security. Long arms of stone and concrete enclose snug harbors where ships may find protection, and lights and buoys guide the mariner along ways of safety. Now vessels from all ports on the Great Lakes system and even from Europe ride her waters.

Lake Erie is the fourth largest of the Great Lakes and its waters wash the shores of four great states, Michigan, Ohio, Pennsylvania and New York, as well as that of the Province of Ontario in Canada. It is 240 miles long, 57 miles wide and has a water surface area of 9,940 square miles. Its mean average water surface is 570 feet above sea level.

It receives the water of its sister lakes, Superior, Huron and Michigan, through Lake St. Clair and the Detroit River and discharges it into Lake Ontario through the Niagara River, where it thunders over mighty Niagara Falls.

Navigation between Lake Erie and Lake Huron does not require the assistance of canals and locks, for the fall is less than nine feet. Between Lake Erie and Lake Ontario, however, the fall is 326 feet and navigation proceeds between the lakes only because of the man-made marvel embodied in the Welland Canal through which ships of medium draft can proceed via Lake Ontario and the St. Lawrence to the Atlantic. Another connection between Lake Erie and the Atlantic is through the Erie Canal and the Hudson River.

Many of the craft plying the lake belong to the commercial fishermen, for Lake Erie has always topped the list of Great Lakes in productivity of her net fisheries. Total production has varied considerably, influenced mainly by fluctuations of the cisco population. The New York portion of the annual market crop of food fish from the lake still averages close to 2,000,000 pounds. Two of the top quality commercial species, the whitefish and cisco (also called Lake Erie herring), are rarely encountered by the angler. In addition to the direct support of commercial fishing, Lake Erie strongly influenced several other industries.

Iron and other metals from the Lake Superior region meet the coal from Pennsylvania and Virginia on the shores of Lake Erie, and from this union have grown the vast steel industries extending from Lackawanna to Pittsburgh. Wheat from the granaries of the West has made Buffalo the largest wheat milling center in the world. Finished automobiles in endless procession fill the vessels that come from Detroit.

ERIE brings its blessings to those along the shores in other ways too. Her broad surface absorbs the heat of the sun and doles it out thereafter in small parcels. This leveling out of the air temperature modifies the seasons and often prevents sudden frosts, so that vineyards and orchards have grown up along its shores. At Westfield is

the Welch Grape Juice Company, said to be the largest processor of grape juice in the world, and the vineyards and orchards in the vicinity of Dunkirk and Fredonia are world famous.

We do get frosts, however. A view out of the office window on February 1st showed Lake Erie to be a vast gray mass of seething waves that drove the spume high in the air as they dashed over the breakwall. A few days before, the official recording showed the temperature of the lake to be 35° F. Overnight the air temperature dropped to near zero and the wind died down. The next morning the lake was flat and icebound.

Some benighted souls view this circumstance with complacence. As soon as the ice is thick enough they fare forth with tip-ups and tipple, windbreaks, spudding irons and an old woolen sock in which to keep their minnows from freezing. Long before daybreak they hurry out on the ice in the hope that they can land a few perch or pike before they freeze to death, and it is said there are some who enjoy all this even without the tipple.

Most of us like to take our fishing after our blood is sufficiently thinned by the sulphur and molasses that comes with spring. We like to drift in a boat abaft balmy breezes trailing a soft-shell crab behind a tiny silver spinner, with an outboard motor to take us back to the starting point when the drift is completed. To those equipped with such a rig and a knowledge of the reefs, Lake Erie is kind indeed. Erie bass snap greedily at such a moving lure. Boats may be had at dozens of liveries all the way down the lake from Buffalo to VanBuren and beyond.

TO ANGLERS, Lake Erie is a bountiful, if whimsical benefactress. Her waters literally teem with bass and yellow pike—if you know where to find them and especially if the weather permits you to go after them. All the way from the tiny fishing village of Barcelona east to Buffalo, the surface of the lake near shore is illuminated on calm summer evenings with the light of myriads of gasoline lanterns. On good nights, blue and yellow pike can be taken by the hundreds. Those who know the reefs and shoals can find the black bass; those who don't perchance can beguile or hire the services of those who do.

At times when the water near the reefs is roily, the sheepshead can be somewhat of a nuisance. Although they have an extra set of teeth in their throat with which to crush even hard-shell crabs, they are not averse to latching on to a shedder when it is offered. Since they feed on various forms of shelled bottom life exposed when the wind stirs up the water, they can usually be found hanging around the bass grounds when the lake takes on a gray or brownish tinge.

Although bass and pike-perch constitute the chief quarry of Lake Erie anglers, many a nice mess of perch has been taken alongside a bed of weeds, with always the odd chance that something bigger like a pickerel or bass may be lurking there. Most of the harbors enclosed by breakwalls have numerous patches of these weeds which pay dividends at times when the wind is blowing too hard to enable the anglers to get outside of the breakwall.

Many an old codger now feeling the twinges in the joints that come with age remembers the day when as a boy his dad took him fishing behind the Buffalo breakwall at Michigan gap. He can remember his delight when they dropped anchor at No. 8 or No. 23 (marked on the stones of the wall in red paint), for here there were always plenty of fat rock bass to be had. And he can also remember a rock bass weighing half a pound or more done to a golden brown with egg and cracker crumbs. The memory brings on a drool even now.

Cattaraugus County . . .

WE HATE to begin this way, but the name Cattaraugus is derived from the Indian and it means—"stinking shore". There are still Indians in Cattaraugus, in fact there are three reservations in the county, Oil Springs, Cattaraugus, and Allegany. But it seems likely that if the Indians had to do a repeat job on naming the county they'd pick a different one because Cattaraugus isn't what it used to be: in the old days it was considered a jumping off place for points west and south and was abandoned by migrant pioneers and land speculators for easier pickings on the Erie Canal route. Cattaraugus was too cold for them—it couldn't grow wheat, and wheat and livestock were pushing the growth of the country in those days.

Now, there aren't many complaints about Cattaraugus, at least from our point of view. In winter it has quite a reputation for winter sports, particularly in Allegany State Park; in summer, for camping, fishing, hiking and bathing; in fall, for hunting, mainly for deer; in spring—well, the county has taken State leadership in the production of maple syrup and sugar. With all this and more too, the Indians ought to have a new word for it.

Cattaraugus, with 1,343 square miles, is the eighth largest of New York's counties. Within its boundaries are the watersheds of two great river systems, the St. Lawrence and the Mississippi. About 50 per cent of the county is either abandoned or forest land, but in the latter are included several tracts of virgin timber. In the Allegany State Park at Stoddard Hollow Creek there are about 1300 acres of beech, sugar maple, hemlock and yellow birch, and in The Red House Valley is another similar tract—almost all virgin timber. Another interesting section is The Owlenburg Bog of 400 acres, an example of the type of vegetation that started its development at the time of the last Wisconsin Glacier nearly 40,000 years ago.

In this connection Cattaraugus County has both glacial and pre-glacial geological areas. Geological formations known throughout the country are the huge boulder cities of which Rock City, south of Olean, is the largest.

More than 78,000 acres of farm land were abandoned in Cattaraugus County between 1900 and 1935. Yet there was a time when this very land was fought over. In addition to its other claims to fame Cattaraugus is one of the view counties in the State which has had a private war all of its own—the so-called Dutch Hill War of 1844 in which the inhabitants rose up against the Devereaux Land Company.

The rapid abandonment of farm land, however, has presented this Department and allied conservation agencies with a golden opportunity to put its reforestation theories into practice. Besides Allegany State Park, there are nine State Forests (formerly known as reforestation areas) totaling about 25,000 acres, under the direction of a District Forester. These areas are now being developed under the State-wide postwar plan for forests—which includes both silviculture and fire prevention work.

Between 1909 and 1948 about 20,000 acres of trees have been planted with 19,972,000 State-furnished trees. 6,880,000 of these have been planted on private land; 2,479,000 in State parks; 7,903,000 in State Forests, while various institutions and agencies have put out another 149,000 to bring the State-planted total up to 10,531,000 trees. Municipalities and school districts have set out another 1,788,000, and industry, Boy Scouts and miscellaneous groups have planted another 593,000. All in all this adds up to a pretty impressive reforestation record for any county.

FORESTRY is in the Cattaraugus tradition. Time was when enormous white pines grew so far apart that it was possible to drive a horse and shay through the forest. And there was a time too when millions of feet of pine, singly in logs or tied together in great timber rafts, tumbled and ground their way down the Allegany to Pittsburgh and Cincinnati. Reforestation is also a tradition in the county; one of the country's earliest nurseries was established at Salamanca in 1908 under Forest, Fish and Game Commissioner James S. Whipple.

But to leave the past: Allegany State Park is a 57,962-acre playground providing for the western and Southern Tier sections of the State what the Adirondack and Catskill parks provide for the east and north. In summer and fall the park is open to hunting and fishing and camping. Trailer and tent camps plus electrified cabins are available in addition to a fine lodge with restaurant and sleeping facilities. Winter sports fans will find skating, tobogganing and some 60 miles of ski trails together with downhill and slalom courses serviced by a ski tow. Every year there are 30 and 50-meter jump meets. All this in Allegany State Park.

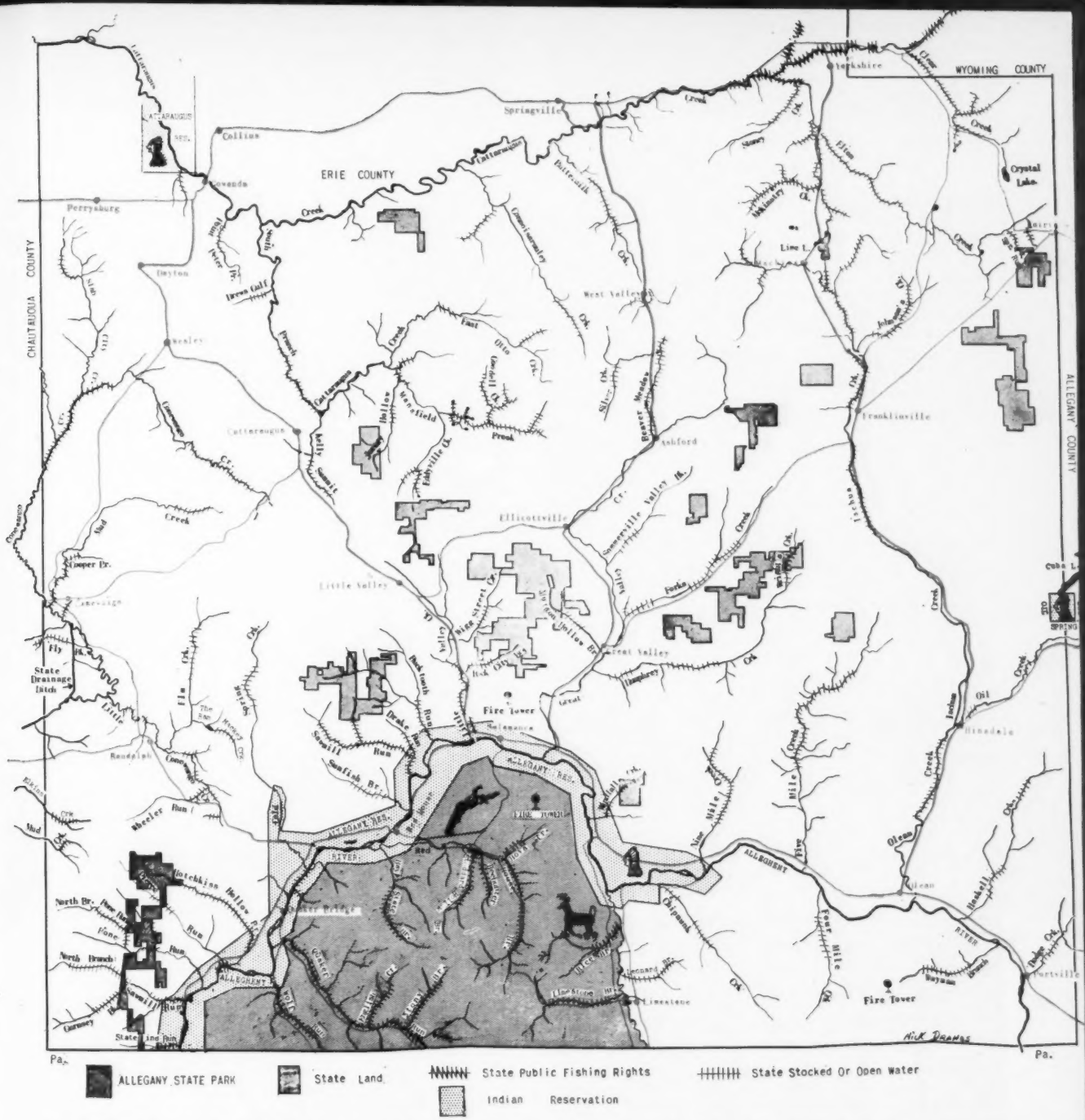
For the hunter Cattaraugus offers a variety of game, although the whitetail is unquestionably the most important species. This past fall, with a season on deer of either sex in effect, 3,793 animals were taken. Although it is not anticipated that another such season will be necessary for a number of years, recent reports indicate that the over-all take of deer was less than 40 per cent of the total herd, so that an excellent seed stock remains.

AS for other species, the varying hare, protected by a closed season this past year, is now fairly abundant and on the upgrade. Grouse, while still below normal in number, are nevertheless at their highest peak in recent years. Squirrels and black bear, on the other hand have been scarce for the past two years, although a few bear were taken last fall. The native stock of woodcock is low and pheasants are mainly limited to the broader valleys and the Conewango Swamp area. Cottontails are increasing and a good seed stock points to a reasonably satisfactory season this coming fall.

Although not usually classed as a game animal, the fox provides a great deal of sport. Foxes are abundant and healthy (we have had no reports of rabies in Cattaraugus), and local citizens appear to have been more alert than residents of other counties in the State to take advantage of this fact. In any case, fox hunting is a popular sport, and many local sportsmen have arrived at the opinion that a controlled fox population is an asset rather than a liability.

For the trapper, beaver are now well established. Muskrats, however, are a source of worry to the Department as the population has been low for several years. Mink, weasel and raccoon are common, opossum, scarce.

Probably of more interest to the sportsmen at this time of year is the fishing prospectus. The Department's Randolph Hatchery is surpassed in size only by those at Rome and Bath, and in quality by none. Randolph produces an average of 40,000 pounds of trout per year; also 4,000,000 brown trout,



1,000,000 rainbow and 2,500,000 brook trout eggs, most of which are distributed to other Department hatcheries.

The State stocks 19 brown, 57 brook and 9 rainbow trout streams in Cattaraugus County. For browns, you might try Clear, Five Mile, Ischua and Little Conewango creeks, or Mansfield and Red House brooks and Quaker Run. (See map).

For brook trout your best bets are Mansfield Brook, Quaker Run, and Johnson's, Stoney, Nine Mile and Goodell creeks. Elton, Little Conewango and Little Valley creeks provide good fishing for rainbows, and rainbows can also be taken (by those who know how) from the Allegany in the cold-water section near Steamburg. Incidentally, if you want to fish on any of the Indian reservations a special permit is required.

Bass are taken in the Allegany between Olean and Vandalia and also in Clear Creek from the mouth upstream a mile or two, although this section is partly posted. Occasionally muskies are taken from Olean Creek, but the State drainage ditch and Conewango Creek from Crystal Springs down to Little Conewango are better producers.

Cattaraugus does not have the Statewide reputation as a recreational center which some of our Adirondack and Catskill counties enjoy. Nevertheless, for sportsmen in the Southern Tier and western sections of the State (and we don't mean just hunters and fishermen) it has an impressive and well deserved local reputation. Furthermore, the county's recreational facilities are being improved, and expanded, all the time.

—NICK DRAHOS.

Scatter Shots

Notes of General Interest

BEAVER BUSINESS—To hold beaver-impounded waters at a static level, a research technician in the New Hampshire Fish and Game Department has hit upon the idea of inserting a four-inch fiber drain pipe through the dam at the desired height. To prevent the beaver from plugging the bore of the pipe, the technician perforates the entire wall of the outlet to make an unpluggable sieve.

Several months of testing showed the device highly effective in preventing beaver from flooding valuable agricultural or forest lands. But if we know beaver, right now they're working out some sort of retaliation.

VICKERS AGAIN—This past week while over in Gloversville I was approached by a young lady on the street who is very much interested in conservation. She told me that during her school days she did considerable traveling through the woods with her dad who was an ardent lover of wildlife, and that she had made a study of the beaver with her dad. She went on to say that when the beaver order (declaring an open season) came out this year, she could not figure out how the beaver could grow that additional four inches of tail that is supposed to be left on the beaver pelt in order for it to be tagged.

This young lady was very sincere. She could not figure out how the beaver could grow the four inches of tail. At first I thought she was kidding me, but after talking with her I found she was in earnest about it. Assistant District Game Protector Rivenburgh was with me at the time and we both talked with her and told her the beaver was born with the tail.

This young lady is a High School graduate as well as a Registered Nurse. She apologized for being so ignorant. She said she just couldn't figure it all out.

—R. J. VICKERS,
District Game Protector

People who have been following the sportsmen's show circuit are by now familiar with these bear cubs, born January 28 in the northeastern Adirondacks. The cubs, born in the nest shown below, were discovered by two men who stumbled over them while hunting snowshoe rabbits. The nest—and the mother bear and the cubs in it—were covered with snow at the time. Roused from her sleep, mother bear took off. So did the hunters. Investigation the next day disclosed that mother bear apparently had no intention of coming back, since her tracks were followed eight miles directly away from the nest. So now we're mama, and if anybody thinks we're enjoying it—

GUINEA HEN—According to George Ensign, President of the Stillwater Rod and Gun Club, this is what happened: The pup showed at least one thoroughbred ancestor in the arched quiver of his tail as he eagerly nosed the fresh bird scent into the hedgerow. But next second the pup showed more elementary breeding as he turned tail and erupted from the brush, one mad guinea hen in fiery-beaked pursuit. Before the ruffled bird returned to round up her brood, the mongrel was showing remarkable greyhound strains.

How come—guinea hen? The Stillwater club, emulating a southern state which accords game bird status to the guinea, liberated 24 pairs of young domestics and reports that they're doing fine in the wild. They say that guinea papas, to keep the fox's figure slim, drive their young into trees to roost. Also mentioned was the bird's knack for bewildering dogs by tricky ground travel before and after flight.

Said to lead with his left even at large hawks, the gritty guinea is to many sportsmen just part of the recipe for a Silver Doctor fly. Other persons favor his plump presence in a recipe calling for strips of bacon. As an ingredient of the Great Outdoors, his possibilities will bear watching.

REAL WORK—Howard W. Bobseine, Assistant Game Research Investigator of the Allegany Game Management District, brings to light the story of a club doing a real conservation job that should put to shame those clubs that think only in terms of hunting and fishing. It's a story of a sportsmen's organization that has discovered (as others are beginning to) that the future of widelife is directly dependent on what is accomplished on the land.

On October 8, 1943 the club (the Cattaraugus Rod and Gun Club, Inc.) became a co-operator in the local Soil Conservation District. The spring of '45 found the majority of the recommended practices for sound land use established, and today the wisdom of working with the land is evident on the 44-acre tract tackled by the club. Under

JOHN BURTON, guide GEORGE CASLER, sport HOBE CASLER, sport HENRY COURTNEY, guide

BARK SHANTY ON T LAKE-50 YEARS AGO

All set for some Hamilton County jacking. Notice the barrel chimney, jacklight, pack basket cover, vest-watch combination, suspenders-belt combination—and Hobe Casler's gun, which may be a Pieper rifle-shotgun combination.—Photograph sent to us by John Knox, Piseco Lake

another agreement between the club and the District in 1945, a former dairy farm has been undergoing a program of soil improvement, pasture improvement, reforestation, border planting, contour hedge-rowing and pond and marsh development. And this year the club is fencing plantations that border neighboring farms; woodlands on both areas are undergoing forestry management. Incidentally, not an acre of club property is posted against hunting and fishing.

In carrying out an educational program in addition, the club has given complimentary subscriptions of THE CONSERVATIONIST to the local library and Central School, shown educational films, and interested the local Legion Post in sending a boy to a conservation education camp; (the club also sends a boy). Even stream improvement and streambank protection work is getting attention.

Do the club members think all this has been worthwhile? Recently, when one of them won $500 worth of marine equipment on a radio program, he was asked: "How can we put more fish in our streams and more game in our woods?" He answered: "The real answer to better hunting and fishing is soil conservation".

CYCLE COMPLETE?—District Ranger George J. Youngs of Bath says he's heard reforestation areas called about everything, including "game barrens". But he believes that this notation, taken from a local newspaper, just about completes the cycle:

"Perhaps the reforestation of so much abandoned land hereabouts encourages the encroachment of wolves and wildcats of late years. They think our town (Parishville) has gone back to prepioneer days, and maybe it will in time. One hundred years ago our grandfathers with great exertions cleared this region of its great forests; now it is being planted again to trees which grow rapidly and seem to thrive in our sand. Where will reforestation end?"

UNQUOTE – We can't quote the raven(s) nor the Department photographer and writer who scoured the hills near Cooperstown looking for them. But we can quote Frank C. Carpenter of the Cooperstown Freeman, who's observed the pair and who at this moment is still waiting with his camera for their return.

Corvus corax principalis is such a rarity in New York that it's no wonder Mr. and Mrs. Carpenter were puzzled when they first spotted the pair of ravens sitting in the top of an elm down in a pasture near Cooperstown. This was on December 1st. They kept showing up about 9 a. m. all through December, January and February, but about March 1 they disappeared and haven't been seen since—not around Cooperstown, anyway.

Their method of soaring and their odd walk marked the birds as unusual to the Carpenters. A little squib about them in the Freeman fell into the hands of Prof. A. A. Allen, ornithologist at Cornell, and subsequent comparisons identified the birds as ravens. Yes, they had notched wings and curved beaks.

Belonging to mature forest communities, the raven was discouraged by a reduction of the growth of standing timber in this State, and in the late 1800's only a few were noted in the western Adirondacks. It once bred from northwest Alaska and Greenland south to Washington, central Minnesota and the coast of New Jersey, and in the mountains as far as Georgia. In New York, only stragglers have been noticed outside the Adirondacks; one was observed on the border of Schoharie County by John Burroughs.

Decidedly larger than a crow, the raven is more sedate and retiring and walks with an easy, graceful air, deliberately and with dignity. In flight it sails more than its relative and its wing stroke is decidedly peculiar.—R.B.M.

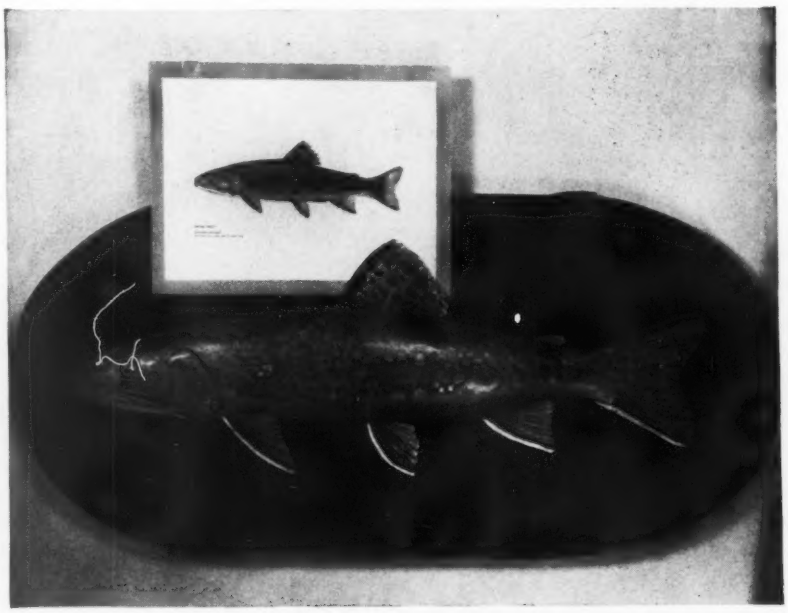
HAIL & FAREWELL—The otter, its belly only half full, slid snakily into a springhole on the Schroon River and swam under the ice sheath into the lake toward Lockwood's Bay, toward the great northern pike feeding grounds. Over its head, Mr. Harry Gibbs of Schroon Lake innocently baited his tip-up with a small sucker and sat back to await developments.

The hungry animal spotted the sucker and wolfed it down. The hook embedded itself in its upper lip. Mr. Gibbs saw signs of underwater activity and hauled in sturdily. Mr. Gibbs had never felt such a pull and once or twice he had a funny feeling; he thought he saw something big and brownish swish past the hole, but he wasn't quite sure.

Then suddenly the darkness of the hole was broken by a snout, two webbed paws and a pair of glaring eyes. The otter braced itself against the edge of the ice and pulled. Mr. Gibbs stared right back and pulled. Then the hook broke loose and the otter arched its body in one of those unbelieveably graceful curves, and vanished.

COUNTY MAPS—Since publishing the first of our county maps (Sullivan) in the preceding issue, we have had a number of inquiries concerning State-stocked and open waters.

The State does not stock posted waters; therefore State-stocked waters at the time of stocking are open to the public, and are so indicated on our maps. Landowners, however, may post their waters without notice, provided such waters have not been State-stocked with their knowledge and consent.



Many people admire our color plates of fish, but Mr. C. S. Lewis of Oswego goes further; using our brook trout (Feb.-March '48 issue), he carved, painted and sent to us an excellent replica.

OPEN WINTER – The winter just passed was the fourth mildest since 1890 when the Weather Bureau began keeping State averages. The average temperature was 29.1 degrees for the three months used for comparative purposes – December, January and February.

The mildest winter on record was the 1931-32 season, with a temperature average of 31.2 degrees. For the following year it dropped to 30.3. The next mild winter was that of 1936-37 when a 30-degree average was recorded. Incidentally, that rugged winter of 1947-48, which set several records for cold weather, had a temperature average of 20.4 degrees.

WINTER FOR DEER – The past winter has been an exceptional one in many ways, but exceptional indeed has been the fare of the whitetail in the Adirondacks this season. There was practically no restriction of foraging ability.

The unhampered movement of animals made for much less competition for palatable browse species—which means that the vigor of both the deer and the range improved accordingly. The condition of some deer, killed in highway accidents and by dogs in late February, showed a reserve of well fatted tissue. There is little doubt that the mild season will reflect itself in the vigor of this year's fawn crop.

For your Information

FIRST REPORTS–Despite extensive pre-season runs of the rainbows in Catharine Creek, fishermen apparently were not discouraged, for they showed up Opening Day in the largest numbers yet–judging by a spot check of the concentration. Twelve hundred and ninety automobiles were counted on a nine-mile stretch along the highway skirting the stream; Deckertown Pool, approximately a 15x20 foot area of water, contained 37 fishermen who before 9 a. m. took 27 trout. Catharine's water was low and somewhat discolored; conditions were not considered ideal, and the largest catch was a 10½ pounder. On Keuka Inlet the water was low and clear but catches were few.

And the boys who went out on Lake George for lake trout Opening Day had a cold, rough time of it. A north wind blew all day long, in spite of which there were some fair catches. The next day the weather was milder, more fishermen went out, catches were better. Sunday was the best day of all, but even then, although there were a few seven and eight-pounders, most of the trout ran small.

NURSERY CONFERENCE – New York will play host to 14 states and the U. S. Forest Service at a Forest Nursery Conference to be held at the Saratoga Nursery on May 9 and 10. This conference was proposed at a joint meeting of the 14 State Foresters of the northeastern states comprising Region 7 of the U. S. Forest Service. It is expected there will be one or two representatives from each state in attendance at the conference, in addition to Forest Service personnel from Region 7 and two representatives from Georgia and Wisconsin. The persons attending the conference will be for the most part professional foresters or nursery technicians interested in recent developments along the lines of the mechanization of nursery practice and the advanced methods of weed control by means of oil sprays.

Up to the start of the late war the supply of nursery labor was sufficient to operate State and Federal nurseries by so-called "hand methods". Previously very little thought had been given to other methods. But during and immediately after the war, when labor was scarce, it became apparent that if normal production of trees was to be maintained mechanical equipment must be invented and developed to continue operations. Small scale tree production was out of the question in the face of greatly increased demands for trees for reforesting purposes.

The purpose of the Saratoga Conference is to assemble and co-ordinate ideas concerning nursery machinery and the control of weeds by the use of oil sprays. New York was chosen as a site for the conference because of the rapid advances made during the past three years in mechanization of nursery operations and in large scale methods of weed control, both of which have attracted national attention among foresters and nurserymen. These developments will be described in more detail in the next issue of THE CONSERVATIONIST.

1949 LEGISLATION–Although the passage of the pollution bill described on page 12 overshadowed all other conservation legislation, there were an unprecedented number of other bills. A total of 83 bills affecting conservation were actually passed and placed before the Governor for his approval–an unusual number and, of course, only a part of the total introduced. As of this writing it has been possible for the Governor to act on only a little over half of this number and, because the thirty-day bill period which he has available for action on bills will not expire for some time, it is not possible to give a complete round-up of 1949 legislation in this issue.

However, in accordance with the practice started last year, the next issue will contain a loose leaf insert giving a complete summary of the new laws in brief form.

ORVILLE BETTERS–The Conservation Department as a whole–and Forest District 9 in the northern Adirondacks in particular–suffered a great loss on March 4 when Ranger Orville Betters, 50 years old and 15 years a Ranger, died in Saranac Lake.

Orville had thousands of friends, not only in his own district where he was friend and counsellor to a host of summer and winter visitors, but throughout the State where he worked on special assignments as a Forest Ranger. It can be said of him as it can be truly said of few others, that his entire life was devoted to a love and understanding of our forests and lakes and mountains–and the wildlife that lives in them. His way of life and his many good deeds will always be remembered by those of us who knew him.—W. E. PETTY

BEAVER AND OTTER–The beaver and otter season of February 15-28, advanced one month over seasons of past years, was calculated to regulate the take and provide for a sustained annual yield, especially in the Adirondack counties. In other counties of the east central and lower Hudson region, beaver damage complaints had reached such proportions that a reduction in population was necessary and desirable.

A winter of surprisingly high temperatures and little snow caused a somewhat lower take than expected. The open winter allowed the animals to cut fresh food until the time the season opened, and the feed beds in general, according to first-hand reports, had not deteriorated and the animals had little reason to move to the bait sticks of the trappers. Weather conditions also made for an advance in the mating season which in turn affected their usual feeding activities.

The take this year certainly is not an indication of the actual populations, and in many areas trappers and landowners alike were disappointed that more of the supply could not be harvested. In general, the take per trapper was down somewhat from the season of 1948 when 1,734 trappers took 4,328 animals, or about 2.4 animals each. This year 869 trappers took 1,966 animals, or about 2.3 each.

Notwithstanding the poor take this season it is quite evident that under normal winter conditions in the major beaver range of the State an early season can be used to regulate the take of beaver–to assure a sustained yearly yield–rather than periodic open and closed seasons.

The season for otter was opened for the same period as beaver to further alleviate the illegal take of beaver in supposed otter sets. Nevertheless with the later season some 73 trappers were successful in taking 83 animals, the majority coming from the Adirondacks.

HELPFUL IDEAS–Sportsmen are making the lot of the fish and game law violator tougher every day.

The Sodus Rod and Gun Club, Inc. spends a lot of time and money to promote pheasant shooting in that town and throughout Wayne County. In this connection, the club has a standing offer of $25 to the person giving information leading to the arrest and conviction of anyone taking fish and game illegally. Thus the club protects the interests of its 400 members as well as those of the farmers and business men of the community who have been co-operating with the club and aiding local Game Protectors.

Rotenone

IF YOU ARE a gardener, very likely you have used powder or liquid containing rotenone. This is a powerful insecticide contained in certain tropical plants, especially roots of derris and cube, and although virtually nonpoisonous to humans or livestock, it is very effective in killing fish and other gill-breathers. This is a good point to remember, for the equipment used in applying rotenone sprays or dust should never be washed out in a stream where fish live. Strange as it may seem, however, the intentional use of rotenone to destroy fish is becoming recognized as a very promising method for improving angling.

Fish conservation has long been handicapped by a lack of general recognition of the principles of competition among fish. Over a long period of well-intentioned but frequently destructive planting of non-native species of fish—and of thoughtless liberation of unused bait fish—much damage has been done. To single out just one example, the spread of yellow perch into many Adirondack trout waters has knocked out a large acreage of water much more valuable for trout production than for perch. Destruction of weeds is vital to crop production. Similar principles apply when the "crops" are desirable game fish and the "weeds" are the undesirable fish which so greatly decrease the carrying capacity for the game fish essential to good angling.

A plan for getting rid of undesirable fish and keeping them out, so that a maximum population of useful fish can be developed, is an idea that anglers today and in the future should consider very seriously. Before jumping to the conclusion that such methods would be costly and impractical, the contemplative angler may well ask himself how practical are some of the present attempts to keep up fishing against unfavorable fish population conditions. But even if chemical methods and fish poisons are viewed as the last resort, it must be recognized that a considerable number of waters will require a more intensive treatment than is now being given them.

THE use of rotenone or other poisons in taking fish is illegal. Rightly so. Chemical treatment to kill undesirable fish can become useful only if carefully controlled for constructive, not destructive, purposes. Moreover, the complete or partial elimination of a population of undesirable fish can accomplish little unless done as an integral part of a management plan effective in building up desirable fish and in keeping up this new population at a high level. To the fisheries biologists, who have experimented with treating waters with rotenone and other compounds for killing fish in a number of states, many complex angles have presented themselves in the problem of changing over an undesirable fish population to a desirable one, even on an experimental scale.

But enough has already been learned to indicate that very low dilutions of rotenone, say about one half part per million, can be effectively used to destroy yellow perch, which are one of the worst pests of trout waters (even though good fish in their own type of habitat). Bullheads, on the other hand, often so stunted and small that they are a bad pest in trout waters, are very resistant; there are such differences in tolerance by various species. Differences in activity of rotenone with water temperature also have been found, cold having a retarding effect. Methods of rapid, economical and effective application require considerable study since just one slip in application may give a carry-over of undesirable fish to multiply and start trouble again.

INDICATIONS are that rotenone treatment may some day grow into a large scale, practical method for obtaining better fishing. Whether it is the best fish poison to use is a question that time may settle, but in any case it has many favorable points for it is harmless to plants and does not endanger animals drinking the water. Although many gill-breathing insects and other organisms useful as fish food are killed in treating a lake, many escape. It has actually been demonstrated that waters treated in summer can be stocked the same fall, for rotenone gradually loses its toxicity. Heavy rains which increase the dilution also speed the recovery. When waters are treated too late in the fall for repopulation of fish food, stocking should be delayed until spring. Brook trout planted as three-inch fish in the fall have been found to produce good catches of legal-sized trout in ponds reconditioned by the use of rotenone, for where food is heavy and competition light the trout have a happy time of it. Unfortunately, we have all too few situations of this kind.

Regardless of the future of rotenone, with the ever-increasing pressure on trout and other game fish, it is likely that more and more fish management work will be developed through methods which go farther than the familiar ones of protection and stocking. Nevertheless, the use of rotenone or any other substances that research workers can devise for the same purpose—the destruction of undesirable fish—stands today as a strictly experimental project in New York waters. The areas tested are being selected with the purpose of learning how to operate, for any new work must creep before it can walk. Hence, if your favorite waters are plagued by the wrong species of fish, do not expect the entire fish population can be changed at once. More information about the progress of experiments now under way will be available soon through conclusions of fisheries biologists who are following this subject.

—JOHN R. GREELEY

Where's the Beaver?

Navy

Army

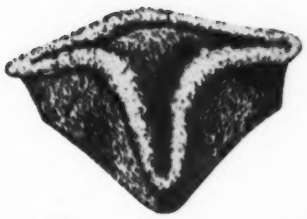
WHEN the silk worm went high hat, the beaver was saved from extinction. For nearly 300 years the principal use to which beaver fur was put was in making hats, and it's highly probable that if haberdashers hadn't discovered how to make hat coverings out of silk, the beaver (and also its South American substitute, the coypu or nutria) would have become as rare as the dodo bird. Then, of course, subsequent conservation measures would have been unnecessary; there would have been no beaver population to rehabilitate.

Prior to 1663 northern Asia had been the chief source of supply, but America soon took the lead and from the establishment of the French and Dutch trading posts on both sides of the Adirondacks early in the 17th Century until the beginning of the 19th Century, the pursuit of the beaver continued without abatement. The numbers killed annually almost pass belief. The Hudson's Bay Company exported 175,000 skins in one year, many of which came from the Adirondacks. Annual exportations from the colony of New York (where fortunes were made in this field alone) reached and exceeded 80,000 annually. As early as 1623 the importance of the beaver to the Dutch colony was so well recognized as to lead to its incorporation in the seal of New Netherlands.

While the beaver was sought primarily for supplying hat makers with its fine, soft wool, this was not the only product which had commercial value. Shaved beaver skins were used in making glue, the oil was used for several purposes, and the castoreum were highly valued in medicine.

Beaver hats were supposed to restore a man's hearing if steadily worn. They didn't drop out of fashion until about 1870, but rapid decrease in the number of beaver in the State had been seriously noted 50 years before that. For the first time in 1820 a law was enacted to prohibit the taking of beavers, and trappers were checked more and more in subsequent legislation. Even so, by 1885 there were by actual count only 20 beaver in New York, and it was necessary to purchase and liberate a few.

Obviously, the beaver has made a comeback—a triumph for conservation. But it's not hard to say what would have happened to him if we gentlemen of fashion still walked the avenues, tipping our D'Orsays. —ROLAND B. MILLER



The Continental

Clerical

The Paris Beau

The Wellington

The D'Orsay

The Regent

LETTERS . . . to the editor

JOLLY CONSUMPTIVE

Dear Editor: Here's "one for the book" and I am prompted to unveil this anecdote after reading Mrs. Kelsey's letter in the last issue of *The Conservationist*, in which she inquires as to the length of time venison may be possessed.

We have had a place in the Adirondacks for many years, and quite a few years ago a friend of mine who had been ill went up there to spend a few weeks recuperating. It was in the early fall, and one evening while sitting in the farm kitchen, he asked how long he could keep venison after the season closed—if he was fortunate enough to get a deer. We had a local couple as caretakers and Dora, the farmer's wife, replied that she didn't exactly know in his case as he didn't have tuberculosis, but if you personally had T. B. you could keep it for thirty days.

Having no reason to doubt her word, he accepted her explanation "pro tem" but with the mental reservation that it seemed like a rather peculiar regulation to say the least. A few days later he got a hunting license at Chestertown and received a syllabus of the game laws with it. You can imagine his amusement that evening when he read that venison could be kept for thirty days after the season ended but only for "PERSONAL CONSUMPTION".

Poor Dora has gone to her Heavenly Rest long since, but we still get a laugh out of her singularly original interpretation of that particular part of the Conservation Law.

C. Albert Jacob, Jr., Scarsdale

BACK ISSUES

Dear Editor: Unfortunately I didn't begin to receive *The Conservationist* until the third issue and I would like very much to have Vol. 1, Nos. 1, and 2. By the way—have just located the address of a cousin in New York State thru his letter published in the magazine. Haven't seen him in several years.

Jason G. Clark, Editor, Anglers' Almanac

• *At this writing, the following back issues can be obtained by writing this office and enclosing 25 cents per copy: Dec. '46-Jan. '47, Feb.-Mar. '47, Apr.-May '47, Aug.-Sept. '47, Oct.-Nov. '47, Dec. '47-Jan. '48, Feb.-Mar. '48, Oct.-Nov. '48 and Feb.-Mar. '49. Sorry we can't supply the others; glad we function as a Missing Persons Bureau.—Editor*

THEM MOIMAIDS

Dear Sir: I went to the Sportsmen's Show at Grand Central Palace last night and found a Mermaid on display over a trout pool. Please let me know who did that one and where and when they are going to stock these—also what is the legal limit?

I had to pay $3.75 for my license—is the extra for catching one of the maids?

Ray Engle, New York City

• *Brother Seagears dreamed a dream.—Editor*

MATTOCK

Gentlemen: The tree planting tool pictured on page 10 of the February-March 1949 issue of your magazine strikes me as the most practical way of planting trees that I have seen. Can you tell me where I can purchase one of these tools? I am particularly interested as I am getting 2,000 trees from you this spring.

C. Beverly Davison, Millbrook

• *It's just a mattock; it could be ordered from any good hardware store.—Editor*

PAINT GUN

Dear Editor: On page 7 of the Dec. 1948-Jan. 1949 edition, mentioned in the text and illustrated, is a paint gun for use in marking trees. This is the article on "Marketing Trees" by Dave Cook. Can you advise me where I may obtain detailed information on this gun including where it may be bought, its price, etc.

A. M. Richards, Little Falls

• *The gun shown is made by Alemite. It sells for approximately $6.25 and I believe it can be purchased from most dealers in automobile service station supplies.—Dave Cook*

GROUSE

Dear Editor: I think more money should be spent in trying to raise for release many more ruffed grouse. I think they would return more real sport than the pheasants which survive. I feel that a much larger per cent of the grouse would survive and in my few days hunting in Broome and Delaware counties I saw very few of them.

Raymond Quick, Binghamton

• *We made an extensive trial of grouse rearing a few years ago. And found that it was very, very expensive.—Editor*

STOCKING POLICY

Dear Editor: At a recent meeting at Newburgh for the purpose of stocking streams in Orange County, a list of proposed streams was read off that were to be stocked in the spring.

Having lived in Orange County over 40 years I am well acquainted with its terrain; therefore, after the meeting I corralled one of the men representing the Conservation Department and tried to explain to him that they propose to stock streams which do not exist, which have been posted for many years, etc. As usual I was given the brush-off.

My criticism was only meant to be constructive, and after reading the last issue of *The Conservationist* I realize the difficulties the Department had in making funds stretch. My contention is that stocking as it is now being done, and has been done for many years, through geological maps, is wasted money. This should be remedied by only stocking those streams which are actual existing trout streams, and which are used by fishermen, and not mere "trickles" running through someone's meadow and which dry up by June.

I am sure if this matter is looked into you will see the value of my suggestion.

Charles J. Schlesinger, New York City

• *One of the principal objectives of the Statewide Biological (fisheries) surveys was to list all streams according to their suitability for stocking with fish. At the time Orange County was covered (1936), practically all the streams of the area (we believe all of any importance) were evaluated in the field for that purpose. The U. S. G. S. quadrangle maps were used simply as a guide for our men in locating the streams and to help in organizing field records systematically; all stocking recommendations were made on the basis of the field records, supplemented by stocking histories and information from local people.*

Enclosed is a distribution list for Orange County. Please note thereon the streams you consider unsuitable for stocking. This information should be sent direct to our Southern Fisheries District: address Mr. Cecil Heacox, 856 Main Street, Poughkeepsie.—Editor

WRITE SOON

As the magazine has grown, so has our mail. We're just as glad to get it as we ever were, and because so much of it makes good reading we're expanding our letters section from two to four pages.

But we're getting a lot of letters that really ought to be addressed to other bureaus in this Department; we usually refer such letters to those bureaus anyhow, but you would probably get more prompt and maybe even more accurate answers if you wrote them direct. About seedling trees, for example, write the Bureau of Nurseries in this office.

Nevertheless, we'll take our mail as it comes—and print it that way. The shorter the letters, the more we can print. So, as we said in the first place, write soon.—Editor.

ADVERTISING?

Dear Editor: I was delighted to read in the February-March issue of *The Conservationist* that the number of copies of this magazine now totals 49,000.

In view of the fact that the Department is in need of additional funds for various uses, why not sell advertising space? There are many sporting goods firms and manufacturers who would gladly buy space in a sporting magazine that issues 49,000 copies.

Ralph B. Risse, New York City

• *Thanks for the suggestion. But our present status as a publication won't permit us to accept advertising, and everything considered perhaps we're better off without it. We think so, even though we could use the funds.—Editor*

OATKA CREEK

Dear Editor: I would like to know why there is not a dam or obstruction of some sort placed in Oatka Creek to prevent different types of fish from migrating up this stream from the Genesee River. Many of the holes that were at one time inhabited by big browns have been taken over by bass, pickerel, pan fish and hordes of suckers.

I have fished Oatka Creek since childhood and have become alarmed at the steadily rising number of fish rather than trout in the stream. Last season I took a number of rock bass, sunfish and bullheads. The black bass in the late summer are almost as common as trout in some parts of the stream. I have a friend in Mumford,

N. Y. who took three big pickerel last year from Oatka Creek between the Mumford Bridge and the twin bridges, a section where the state and county plant many trout each year.

I would like to know if the state plans on doing anything about this ever growing menace.

Richard B. Schleyer, Rochester

• *We have several streams that reverse the ordinary profile of a trout stream by having warm, non-trout water near the headwaters and cold, trout water in the lower part. Oatka Creek is an outstanding instance of that type of situation.*

The trout water is all below the Red Bridge (below LeRoy) where the stream receives its first considerable amounts of spring water. Above LeRoy it is a warm water stream, inhabitated by both species of bass and other species unfavorable for trout. From LeRoy (Buttermilk Falls) to the Red Bridge, for about a mile, the stream goes dry for most of the summer. The dry section prevents downstream migration part of the time but there is plenty of opportunity for the undesirables to drop down at times of high water.

Formerly there were dams at Wheatland Center and at Garbutt preventing upstream migrations. These dams are now out. But the situation is complicated enough so that need for a barrier to prevent upstream migration is questionable. It is our opinion that, considering difficulties and costs of installation of such a barrier, the project would not be worthwhile. Reasons for this opinion may be summarized briefly as follows: (1) Downstream barriers on this scale are impractical and as long as the warm-water, "coarse" species can move downstream into the trout area the value of a barrier to prevent upstream migration is questionable. (2) The cold fast-moving trout sections of this stream are unfavorable for the warm-water species and constitute a partial but effective natural barrier. (3) Installation of a barrier dam by the State would involve procurement of a site as well as the actual construction. Considering the questionable values to be realized, it has not seemed worthwhile to undertake the project.

No one regrets the presence of non-trout competitive and predatory species in this fine trout stream more than we do. Here, as in many streams where the undesirable species are above as well as below the trout water, however, a barrier to upstream migration does not appear to be an effective answer.—C. W. Greene

POLLUTION AND BASS

Dear Editor: Your article in the Dec.-Jan. issue of *The Conservationist*, "Pollution on Long Island," was particularly interesting to me. You have one area blocked out and named "Duck Farm Areas." It so happens that I have done quite a bit of fresh water bass fishing in the Peconic River above the first dam. There are several duck farms on this stretch.

Strange as it may seem the bass that have come out of this water looked very healthy and tasted better than any other bass taken by me in 50 other ponds within reach of New York City.

As a comparison, in July, my friend and I fished Brown's Pond near Newburgh. This is part of the water supply for that city and maintained as such. We took a half dozen bass home and to our amazement they contained small red worms, about an inch and a half long, in the flesh. However, we fried a couple anyway and they tasted just as musty as most bass do. These worms were nothing new to us; we have found them several times before in different waters.

Fred H. Blohm, Brooklyn

• *Some of the most bitter correspondence in this Department's files comes from a lawyer in Riverhead who complained that fish taken above the third dam on the Peconic River were not edible because of duck pollution; he upbraided the Department for not doing something about it. Conditions above the first dam are very comparable, and we find it hard to account for the discrepancy between your description and his. Nevertheless, it is certain that the taste of bass does vary from water to water. The red worm you refer to is the eel roundworm found in several species of fish in the lower Hudson and vicinity. So far as is known it's harmless to humans.—Editor*

LIFE OF A DEER

Dear Sir: Would you kindly advise me relative to the average life of a deer. My buddies claim anywhere from five to fifteen years.

Grant Crumley, White Lake

• *Disregarding the influence of hunting, about 12 years. But that figure is meaningless in this State where the oldest buck to go through checking stations last fall was 10 years old. A 12-year average life span is simply what might be expected if all factors were favorable to the deer.—Editor*

WHAT IS A WILDCAT?

Dear Sirs: Would you kindly give me some information on bobcat and wildcat. My son argues that they are the same animal. My wife and I argue that they are two different animals, and that the bobcat and Canadian Lynx are the same thing.

Joseph E. Feathers, Schenectady

• *A bobcat is a wildcat, and vice versa. A lynx (apparently extinct in this State) is something else again. See page 40 Dec.-Jan., 48-49 issue.—Editor*

FREEZERS AND LOCKERS

Dear Editor: I believe that a law should be passed in the State making it compulsory for a freezer and locker company to keep a complete record showing weight and type of cuts taken from a deer they have butchered.

After six years of hunting I was at last fortunate to get my first deer, an eight-point buck. I took the deer to a supposedly reputable Rochester freezer and locker company for butchering. They asked me how I would like it cut up. I told them I would like as many steaks and chops as possible.

When I went back to the locker to pick up some venison, I found, much to my surprise, that I only had five steaks and six chops, none of them loin chops. The bulk of the meat was marked "stew meat", with half a dozen roasts. I complained to the manager of the company and his alibi was that perhaps it was a mistake made by one of the extra butchers he had hired, or some might have fallen off the top of a basket.

I had no way of proving anything. The law is very strict on the possession and transportation of a deer by a sportsman. Why not protect the sportsman by making it just as strict for the butcher?

Incidentally, the deer had four legs when I brought him home but I only had one shank when they finished butchering him.

Albert G. MacBride, Rochester

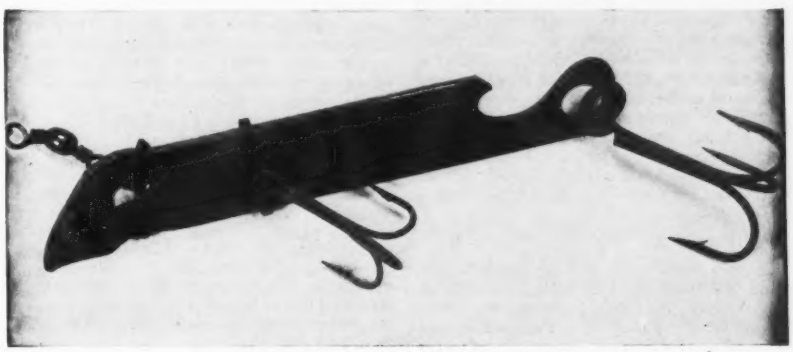
• *Although we have had no other letters on this subject, your remarks concerning the misuse of meat placed in freezers and lockers strike a responsive note in this office. Many of us here and many of our friends outside have had experience similar to yours. But this is a problem for the Legislature, not this Department.—Editor*

LAKE WANAKSINK

Dear Editor: I have been camping in the Harriman Section of the Palisades Interstate Park for three years, doing most of it by Pine Meadow Lake and Lake Wanaksink. In the summer and early fall of each year I noticed that Lake Wanaksink dropped a number of feet. But this year (Oct. 1948) I almost fainted when I found Lake Wanaksink completely dry. There was no lake. Instead there was a rock desert. Please tell me the reason for this disaster.

Ed Bauman, Jr. (No address given)

• *We suggest you write Mr. A. K. Morgan, General Manager, Palisades Interstate Park, Bear Mountain. He could no doubt tell you the reason. It is possible that it drains into caverns periodically.—Editor*



ALL RIGHT, HOW CRAZY CAN YA GET?

Dear Mr. Fowler: After looking over the pictures of the Bass Lures you had in the last *Conservationist*, I decided to send you one found about five years ago by Clarence Kessler, of Sidney, in a snag in the Susquehanna. We have tested this lure out and find that it will hook something nearly every cast. This lure apparently was not intended as a bass lure, but we found that we could catch as many bass on it as we cou'd other kinds of fish.

Try it out; see its wonderful action in the water; you will be amazed.

Howard J. Pulver, Williamstown

P. S. It can still be used as originally intended and will do a nice job.—H. J. P.

• *Brother, you threaten my reputation as the whackiest guy in town. We oughta forma club. You ought to be President.—B. F.*

LONG LAKE MEMORABILIA

Gentlemen: I greatly appreciated Roland B. Miller's historic article in the October-November issue on Long Lake, as I had spent many happy vacations hunting and fishing there without knowing much about it. With my first hunting party we put up with a Mrs. Plumley at her hotel and camp a few miles down from Long Lake village. She had no guides there, then, but secured a nephew, Tim Emerson. He in turn secured Levi Plumley from the camps of Harry Sabattis only a short distance away. We were getting nowhere fast until Sabattis, who had no parties then, took over. After that we always hunted with Sabattis from his camps. He had his living quarters and large dining hall attached, one camp house that could accommodate a dozen hunters and a half dozen one-man cabins.

I also spent some time at the Shaw hotel and farmhouse in Long Lake. I will never forget the fresh milk direct from the herd. From there I once went into the woods with a guide whose name as I recall it was Corry or Cary. There was a garage man in Long Lake named Plumley. I also met quite a number of what might almost have been old timers, but cannot now recall their names. The enclosed snapshot with Harry Sabattis and the letters to and from Sabattis and from Ed Hall will speak for themselves.

Mr. Carson (left) and famous Harry Sabattis

Is my old friend and guide, Harry Sabattis, who was then in 1929 well past sixty, the same mentioned by Mr. Miller? As for myself, I have passed the seventy-ninth blaze on the long trail but still am an active deer hunter. My 1928 membership card of the Game and Fish Protective Association (Nyack) should indicate that I have been not only active but interested in conservation.

Charles W. Carson, Tappan

• *Excerpts from reply to Mr. Carson: Your friend, Ed. Hall, happens to be the uncle of Mrs. Virginia H. Farr's husband, our Forest Ranger Charlie Farr. (Mrs. Farr collaborated on the Long Lake article). Tim Emerson lives about half a mile farther up Kickerville Road than the Farrs. Levi Plumley was killed in some sort of train accident a year or two ago down near Utica. Mrs. Plumley, now very old and feeble, lives in Long Lake with her sister, Mrs. Addie Hewitt. She kept the camp known as Plumley's at the outlet of Long Lake for many years. Mr. Plumley died quite some time ago and she kept on alone for several years, then married Robert Selfridge; gave up the camp about three years ago, both being in poor health. Mr. Selfridge died last year. The camp is now owned by two brothers, Carl and Orville Plumley. There still is a Plumley garage at Long Lake.*

Harry Sabattis, youngest son of Mitchell Sabattis, died about 1933. He was uncle of Joseph Sabattis (mentioned in the article) who now lives in Long Lake and is the son of Charles Sabattis, another of Mitchell's sons. Ed. Hall lives in Long Lake, is married, has a daughter and grandson.—Roland B. Miller

BITTERSWEET

Dear Sirs: In the last issue of *The Conservationist*, I read with interest about Bittersweet. I have none of it on my farm and now I have a desire to get some plants or seeds and get a little of it growing. Please advise.

A. C. Holmes, West Winfield

• *This Department has none for sale or distribution. But bittersweet is advertised in many horticultural magazines and in the Sunday supplements of some of the metropolitan newspapers.—Editor*

LAWS ABOUT GUNS

Dear Sir: I was surpised to read in *The Conservationist* for October-November the answer to a question by the Editor: "As far as the Conservation Law is concerned, you can carry it. (.22 rifle) down Main St. loaded or unloaded, broken or closed."

I was always under the impression that a gun had to be unloaded if walking along any public highway and that a single or double barrel shotgun had to be unloaded or broken. Also I had the idea that it was against the law to shoot closer than 30 feet to a road or to shoot across a public road. Just what are the laws about this?

Another thing I want to get the dope on is about guns in cars. One fellow tells me that the magazine of a gun can be full as long as none is in the chamber. I always thought guns in cars must be unloaded in magazine and chamber.

William C. Cockrell, Wurtsboro

• *It is no violation of the Conservation Law (but watch out for the Penal Law and local ordinances) to possess a loaded gun any place except in or on an automobile. With regard to shooting from highways, the law says that game cannot be taken from a public highway except in the Forest Preserve counties. Even in such counties, game may not be taken from State or county highways. It is a violation to possess a gun loaded with shells in the magazine or barrel in or on an auto.—Editor*

DEAD GAME

Dear Editor: I received *The Conservationist* today. It is okay. Only I thought it would tell me all about fishing and there would be pictures of big fish in it. Perhaps there will be in the summer issues.

Fay Ryder, St. Johnsville

• *Sorry to disappoint you, but we very seldom publish photographs of dead game (including fish), except to prove a point. (See cuts on these pages).—Editor*

PREDATORY CATS

Dear Editor: Could you please tell me the laws, if any, which protect our feline predator, the common house cat. Concerning that fox-pheasant test in Seneca County reported in *The Conservationist*, I truly believe that if 75 percent of the house cats were trapped the pheasant would be abundant. There is a saying I believe has quite a great deal of truth; "The fox gets the blame, the cat gets the game".

New York State, especially Erie County which houses over 250,000 house cats, could use some of the "cat hunts" carried out by Pennsylvania sportsmen.

Robert Struebel, Boston

• *Section 205 of the Conservation Law says: Any person over the age of twenty-one years possessing a hunting license may and game protectors and other peace officers shall humanely destroy cats at large found hunting or killing any bird protected by law or with a dead bird of any species protected by law in its possession; and no action for damages shall lie for such killing.—Editor*

RECORD 'COON

Dear Editor: In your February-March issue you stated that the weight of a game farm raccoon exceeds 30 pounds and a wild one weighs 15 pounds. A friend of mine, Mr. Evert Ojala, of Greenfield Center, who is a 'coon hunter, bagged a 42-pound wild 'coon that his dogs treed last fall. This 'coon was not the biggest that he has shot but it is one that he weighed after he shot it. Two years ago he got a record 'coon but did not bother to weigh it. When he put the 'coon in a frozen food locker in Saratoga, the dressed weight was 22 pounds. According to this, the live weight of a wild 'coon must exceed 50 pounds.

William Johansson, Scotia

• *Wow! But remember all we said was that 15 pounds was a big wild 'coon. It still is. As to Mr. Ojala's 42-pounder, it must have had a very poor figure.—Editor*

PROTECT SPIKEHORNS?

Dear Editor: I would like very much to see spikehorn bucks protected the same as does here in Schoharie County. I think it would save a lot of does, for many hunters shoot a doe thinking it might be a spike. I realize it's a very tough proposition to stop the doe shooting but wouldn't my idea help some?

Howard R. Bailey, Stamford

• *Afraid not. The line on minimum antler length has to be drawn somewhere, and the "sportsman" who shoots a doe on the chance it might be a spikehorn would probably shoot a doe anyway.—Editor*

THOSE STICKERS

Dear Sir: Yes, there is something wrong with the address labels. This one dropped off when the postman handed me my copy.

I would regret missing even one copy of this excellent booklet.

James A. Crawford, Walton

• *We think we licked this problem by leaving the varnish off the top of the back cover; the label wouldn't stick to the varnish.—Editor*

HUDSON SHAD

Dear Editor: There is one question which I would like to ask you concerning shad which run up the Hudson River each spring. I have read quite a lot about shad fishing in the Connecticut River but nothing about the Hudson. I have also heard that the Hudson River shad will not eat while in the river because of the spawning. As I would like to do some shad fishing in the Hudson next spring if at all possible I would appreciate it if you'll straighten me out.

Manuel Berman, New York City

• *Shad are usually taken by angling at concentration points, as below dams, or at least in fairly clear, shallow water. The Hudson has three*

strikes against it in this connection: the water is murky, the shad are not concentrated at any one point, and they stay in relatively deep water out of reach of the fly or spinner fisherman.

As for feeding, shad, like salmon, do very little feeding on the spawning run, though occasionally they take flies, spinners or shrimp bait.—Editor

BETTER LUCK NEXT TIME

Dear Editor: Enclosed find check for $1 to continue my subscription to your magazine. As an out-of-stater I enjoy reading your magazine very much. However I want to tell you I am very disappointed with fishing in New York.

Last summer I spent two weeks in your state, one week in the Finger Lakes section and one in the vicinity of Schroon Lake. On both occasions the people in the party fished hard but not one fish was caught. We are not exactly amateurs as we usually do well in our own state. We tried all types of fishing; trolling, plugging, still fishing, etc. with absolutely no luck at all.

My personal reaction is that New York people like us to come there; stay at their camps, hire their boats, buy bait and in other ways spend money, but they don't seem anxious to see us catch fish. Unless you hire a guide, (which I cannot afford) the natives are very uncooperative in giving any advice about local fishing conditions.

Perhaps we were just unfortunate in meeting up with the wrong people. If there are other types, that would care to get in touch with me, I would be willing to give it another try next summer. If not, then I'll stay home.

Everett A. Hort, Fort Washington, Pa.

DOGS AND DEER

Dear Editor: In the August-September issue of *The Conservationist* there appeared an article entitled "This Fall's Hunting Prospects" in which was cited the many deer that were killed by dogs in the heavy snows. I am enclosing a

snapshot taken of the carcass of a buck which was found caught in a fence. The buck evidently had been frightened as its head was entangled in the fence in such a way that it choked to death. There were several openings in the fence through which the deer could have passed had he been walking leisurely along. If you could use the photograph, it may help impress upon people that dogs running at large are of no benefit to them nor to the preservation of wildlife.

R. H., Kingston

• *We print the photograph for that purpose.—Editor*

DR. HOUSE'S BOOKS

Dear Editor: In my Jan., '49 number of the *N. Y. State Conservationist* I saw a notice of Dr. Homer D. House's retirement as State Botanist. I am interested in learning whether I still could obtain a copy of his "Wild Flowers of N. Y. State" report.

Dr. Katherine H. Borkovich, Baltimore, Md.

• *The State Education Department, which published the books, reports that this edition has been out of print for some time. They have, however, a complete set of 264 color plates (which were used to illustrated the volumes) and these are available by writing to the State Education Department, Albany, and enclosing $2.50. You might get a set of the books from a rare book dealer in your city or in New York. —Editor*

ROUNDWORMS IN GROUSE

Dear Editor: We were hunting this fall for partridges on State land formerly owned by my father (Claude Shultes) on what we call West Mt. Between my father, my husband, brother and myself we got six birds. They were feeding on thornapples in the old pasture lot and were all nice birds except one. I cleaned the birds and when I went to draw them one had two tapeworms in him. They were in back of the kidneys next to the bone. The crop of the bird was empty, though it was quite fat.

I have preserved the worms, in alcohol, if you would care to have me send them to you. We have got many a bird and never saw anything like it before.

Mrs. Ila Van Wagenen Bryant, Schenectady

• *Roundworms (Ascaridia) are frequently found free in the body cavity of grouse and many other birds. Even when they occur in considerable numbers, however, they do not seem to affect the health of the bird. In this case, you noticed that the bird was fat; the fact that its crop was empty was just a coincidence.—Editor*

DEER SEASON

Gentlemen: I would like to know if you can give me any information as to why the deer season was changed from November 1 to October 20. I have inquired of different persons about this and no one can give me a satisfactory answer. Everyone I have spoken to seems to think that it was not a good move for the reason that it is too warm at the opening of the season at the present date. I am referring, of course, to the Adirondack season.

Wilson Abrams, Inwood

• *For years, when the Adirondacks provided most of our deer hunting, the traditional season was October 15-November 15. When the Southern Tier hunting opened up for the last six days of November, the Adirondack season was put back to November 1-30, so that all seasons would end together. After trying the November season citizens of the majority of the Adirondack counties thought it too late and the opening date was brought back to October 20. This year the season will be October 25-November 25. (A report on seasons elsewhere in the State will appear in our next issue.)—Editor*

COUNTY MAP

Dear Editor: I am a subscriber to *The Conservationist* and I would like a little information in reference to your article on Sullivan County, page 18, February-March, and the map about fishing; State stocked and State fishing rights. (1) Where a stream is State stocked and it flows into a lake, is it permissible to fish in the lake also? (2) Arrows indicate State fishing rights; I notice a single arrow on some lakes like Black Lake, Toronto Res., Wolf Pond, Yankee Pond, Wanasink Lake, etc. Do these arrows indicate State fishing rights?

Jack Eskin, Ellenville

• *Where a stream is State stocked, it does not necessarily follow that the lake into which it flows is open water. Double arrows indicate State fishing rights; single arrows are used merely to connect the lakes with their names as printed on the map.—Editor*

CITIZEN RESIDENT?

Dear Editor: I am writing concerning an interpretation of the term "citizen resident" as it applies to hunting and fishing licenses.

I was born and raised in New York State but have been in the military service continuously since 1929. Although I have lived in several states temporarily, I have always claimed New York as my permanent legal address. A friend recently questioned the propriety of my using a citizen resident license when in New York on leave. I am familiar with the wartime exemptions granted military personnel but am not thinking of that, since I never used it. I intend to continue making every effort to go home for a little hunting and/or fiishing each year so wonder if you would please comment. (I have in the past filed, and will continue to file, income tax returns in New York).

Col. Fred Fairchild, Maxwell Field, Ala.

• *You're a citizen resident, sure enough.—Editor*

CATTAILS

Dear Editor: An article in the December-January issue of *The Conservationist* concerning the farm marsh for muskrats interests me a great deal. In the article it mentions that cattails should be established if possible. Where is the seed found in the cattails? Is it found in the commonly called "punk" which is seen in most marshes now? If so, should they be gathered now? What would be the best procedure in planting and when should such seed be planted?

George Grater, Hudson

• *Cattails are most commonly established by planting the whole plant in the spring, but they may also be grown from seed planted directly on the bottom. Seeds may be gathered any time after the first heavy frost in the fall. They are found in the stalk—the brown, cigar-shaped cattail itself. And they may be purchased from the Burgess-Manning Corporation in Chicago at a very small price.—Art Cook*

AUTOLOADING SHOTGUNS

Dear Editor: There is some talk out here in the western part of the State that there is a law coming up to prohibit the use of autoloading guns. Would appreciate any information on this law.

Richard McIntyre, Lockport

• *We've heard of no such law.—Editor*

PHOTO CREDITS

Second cover, pages 16, 22, Clayt Seagears; 4, 12, 14, 25, Doug Finch; 5, 6, Darling Studios, Hudson Falls; 8, P. W. Fosburgh; 17, Dr. Homer D. House; 18, 30, Barnett Fowler, Robert Jarvis; 21, color plate by E. L. Cheatum; 23, A. L. McDowell; 24, Hugh P. Crisp; 25, Fred Chambers; 26, 32, 37, Earl McGuirk; 31, John Knox; fourth cover, Ellen Edmonson, Hugh P. Crisp. (Pilot for aerial, Fred McLane.)

THE COYOTE —Unbidden Guest

THE COYOTE (pronounced to rhyme with guy-oaty) is a sharp and itchy-footed western character who lately has been pulling a Horace Greeley in reverse. Reports of the extension of the beast's range toward the Atlantic have increased by leaps and bounds since 1940. Today it is possible that a New York State census would list several hundred men, women and children of this unwelcome canine tribe—although there was no way of telling. We might have less than 50.

New York has harbored his nimble nibs off and on at least since 1912. More than a decade ago Fred Streever's Walkers were coursing him successfully in Saratoga County. Scattered individuals have appeared in every region. These early records probably concerned escaped or abandoned pets, some of which were Army camp mascots. But now it appears that a supply of coyotes has passed our portals on their own pads.

Since we'll probably see more of him, let's see what we've got.

The coyote definitely is not the kind of little chum one might want to take home for the week-end. As far as the majority of Man's best interests are concerned he appears to be a stinker—interesting no doubt—but still a stinker.

So far no real wrong-doing definitely has been pinned on our subject. But he certainly is causing no end of confusion and speculation simply because some folks insist on calling him a wolf. What with all the sinister aspects of such a title, it's little wonder there's so much ring-dang-do about him.

A coyote should not be confused with a wolf any more than a fox terrier should be confused with an airdale. The most authoritative treatise on the wolves of North America ever written (Young & Goldman's 636-page book) gives the coyote no mention except to say he ain't a wolf.

New York used to have wolves—plenty of the real McCoy—but no coyotes. So far as authenticated records are concerned, New York *still* has no wolves so far, all reports to the contrary and despite the fact that seven northern counties are paying, or recently paid, bounties on "wolves". This adds up to a pretty involved kettle of kippers.

In fact, so much publicity has been printed about "wolves" in the Adirondacks that the Conservation Department during the past year actually received several letters asking, in effect, whether it would be safe to take the wife and kids north for vacation. Of course, the Department views the misinformation leading to such letters with exceedingly dim appreciation. But there are many people who harbor an apparently growing conviction that they'd better whip up the horses when they cross the Blue Line and pray that the only pack they'll see will be on the Mountain View Inn's pinochle piazza.

Much of the wolf confusion probably stems from the fact that locally the coyote often is called brush wolf or prairie wolf. The German shepherd dog, popularly called police dog, is partly responsible for the rest of the mix-up. This one seems perfectly capable of reverting to the wild after a generation of what literally can be called loose living. Unfortunately, many of this breed, the Nation's most popular dog 25 years ago, have gotten out of hand and constitute for the most part the roving bands of homeless canines that seriously plague the State's deer herds. Often they are mistaken for wolves.

In the Adirondacks, at least, there is some evidence that the coyotes are inter-breeding with these homeless dogs, with their offspring taking on the more dominant physical characteristics of the coyote plus the greater poundage of the pooch. Because of the possibility that the Department might get into deer management trouble on this one, it is to launch a coyote trapping project this spring in several Adirondack townships, using a dozen State trappers.

Getting back to the dog problem, it's interesting to note that while coyotes readily breed with dogs and wolves breed readily with dogs, there are no records available which show that coyotes breed with wolves. Ah, Nature *really* is a wondrous operator when it comes to maintaining her wild races in a state of pure quill.

Physically, the coyote is about thrice the weight of the red fox, averaging 25-35 pounds, females being lightest. He's wolf-colored, but a bit more on the tawny side with darkest hairs extending down the back from shoulders to tail tip. The tail is normally straight—like a wolf's—and carried low. His head is decidedly foxy with large, pointed ears and whitish upper lips, cheek and chest (see picture opposite).

Authorities agree that the coyote mates for life. In New York we would expect the young to be born in dug dens during early April. Pups reported out in January and February probably are wild dogs or coyote hybrids mothered by dogs. The coyote seems rather solitary, normally traveling singly.

We never have heard in New York the coyote's evening song nor have we reliable records of its occurrence. But obviously we can expect it. When it comes, it's unmistakable—a series of brisk barks ending in a long-drawn squall or quavering howl. Very rarely is this sound ever uttered by day, although the coyote otherwise is a great barker.

THE coyote, often called the American jackal, also is fox-like in its food habits. He eats everything handy —(new or old), insects and fruit. In California he even has damaged melon crops. He has denuded whole vineyards of grapes. But primarily he's a carrion guzzler. With conditions right, the coyote is perfectly capable of knocking off fawns, calves, sheep—and foxes. Caged foxes among exhibition and study animals at the State Delmar Game Farm hold a captive Adirondack coyote in evident fear although they normally re-act indifferently toward most dogs.

Obtained when a pup, the coyote is readily tamed and trained. Joe LaFlamme, whom many will recall as the white-bearded moose man of the sportsmen's shows, has used coyotes, wolves and dogs in the same sled hitch. He claims the much smaller coyote is a mule for work, is easily fed, can undergo long fasts when pickings are scarce and —pound for pound—can hold its own with anything alive in a battle.

One coyote travels far and leaves much sign. Unfortunately his track can't be told with certainty from a dog's of the same size. There's no question but that we have an overwhelmingly greater population of wandering, homeless dogs which cause enormous damage to wildlife and substantial damage to domestic stock and poultry. True, the coyote is moving East. He may take a long time, even without hindrance from Man, to become established. But he does breed with dogs and his litters are large.

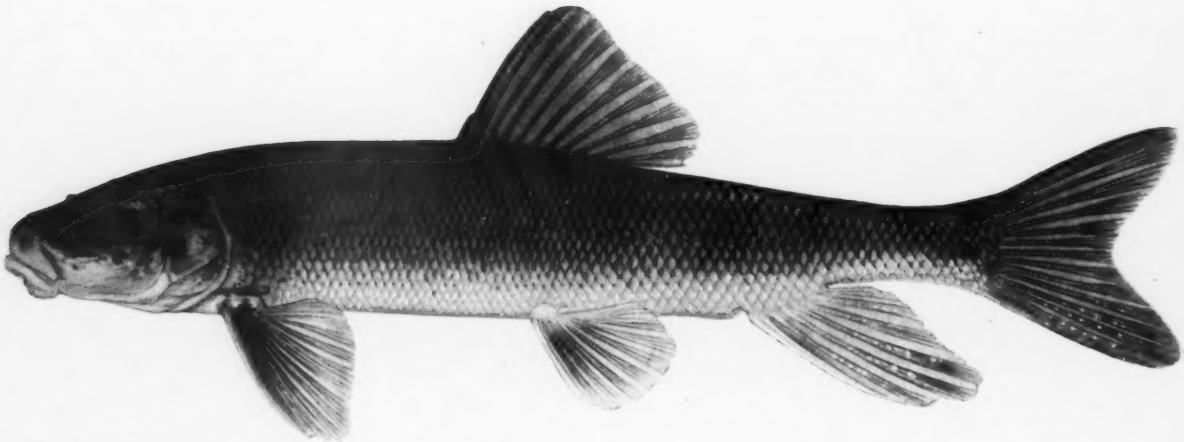
Meantime, we ought to know him and be on guard. Definitely he's an unwelcome guest. —CLAYT SEAGEARS

By Clayt Seagears

The Coyote-
UNBIDDEN GUEST-
for many years has been trying to get a foothold in New York and recently has been reported on the increase.
THE COYOTE SHOULD NOT BE CONFUSED WITH ITS MUCH LARGER AND MORE DESTRUCTIVE COUSIN-THE WOLF - OF WHICH THE CONSERVATION DEPT HAS HAD NO AUTHENTICATED RECORD IN MORE THAN 50 YEARS, ALL REPORTS TO THE CONTRARY
THE NAME IS PRONOUNCED kī-ōt'ē OR, LESS PREFERABLY, kī'ōt
Its scientific name is Canis (dog) latrans (barking)
Adirondack Coyote
Study of captive female trapped in Lake Placid region Feb., 1949
Total length 45 in; tail 12½ in; shoulder ht. 21 in.; weight 23 lbs.
Males may weigh 30-40 lbs.
2⅝ x 2¼
COYOTE L. HIND
1¢
FOR SIZE
Wolf (top) and coyote broken to harness by Joe LaFlamme. Note relative size of nose pads.
WOLF
COYOTE
FOX
Heads for comparison. Note smaller, rounded ears of the wolf. The coyote's ears and muzzle are fox-like.
Tail normally is held low.
FROM PHOTOS
Red Fox
Coyote 6"
EXTRA LARGE
Wolf 7¾"
Lower jaws
Coyote family- The young are born in 63 days-same as dog with which they cross.
CLAYT SEAGEARS

SHORT-HEADED RED-FIN SUCKER

Moxostoma aureolum (LeSueur)
From female 16⅜ inches long



COMMON SUCKER

Catostomus commersonnii commersonnii (Lacepede)
Breeding colors from male 7⅞ inches long